

THE UNO AVIATION MONOGRAPH SERIES

UNOAI Report 98-5

The Symposium Proceedings of the 1998
Air Transport Research Group (ATRG)

Volume 3

Editors

Aisling Reynolds-Feighan

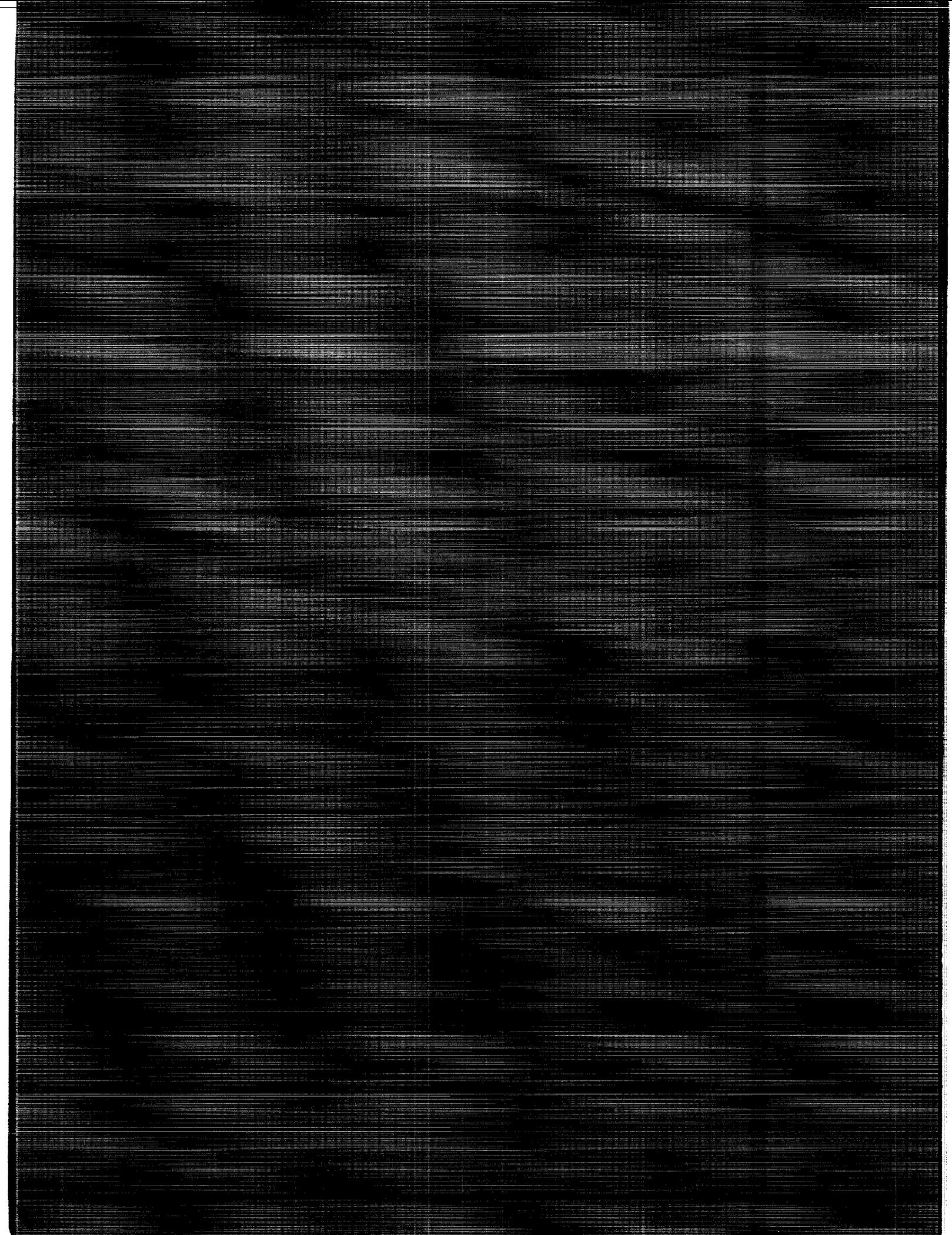
Brian D. Bowen

1998

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Omaha, NE 68182-0508

ATRG President's Foreword

The **Air Transport Research Group** of the WCTR Society was formally launched as a special interest group at the 7th Triennial WCTR in Sydney, Australia in 1995. Since then, our membership base has expanded rapidly, and now includes over 400 active transportation researchers, policy-makers, industry executives, major corporations and research institutes from 28 countries. Our broad membership base and its strong enthusiasm have pushed the group forward, to continuously initiate new events and projects that benefit the aviation industry and research communities worldwide.

It became a tradition that the ATRG would hold an international conference at least once a year. As you know, the 1997 conference was held in Vancouver, Canada. Over 90 papers, panel discussions and invited speeches were presented. In 1998, the ATRG organized a consecutive stream of 14 aviation sessions at the 8th Triennial WCTR Conference (July 12-17: Antwerp). Again, on 19-21 July, 1998, the ATRG Symposium was organized and executed every successfully by Dr. Aisling Reynolds-Feighan of the University College of Dublin.

As in the past, the Aviation Institute at the University of Nebraska at Omaha (Dr. Brent Bowen, Director of the Institute) has kindly agreed to publish the Proceedings of the 1998 ATRG Dublin Symposium (being co-edited by Dr. Aisling Reynolds-Feighan and Professor Brent Bowen), and the Proceedings of the 1998 WCTR-ATRG Conference (being co-edited by Professors Tae H. Oum and Brent Bowen). On behalf of the ATRG members, I would like to express my sincere appreciation to Professor Brent Bowen and to the staff at the Aviation Institute of UNO for their efforts in publishing these ATRG proceedings. Also, I would like to thank and congratulate all the authors of the papers, for their fine contribution to the conferences and the Proceedings.

Finally, I would like to draw your attention to the ATRG newsletter and the ATRG website (www.commerce.ubc.ca/atrg/) which will keep you informed of the ATRG operations and forthcoming events. On behalf of the ATRG Networking Committee, I would also appreciate it very much if you would encourage others in the field, to sign up for ATRG membership. Thank you for your attention.

Tae H. Oum
President, ATRG

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ATRG Symposium Proceedings

University College Dublin, Ireland

July 19-21, 1998

The Symposium

The ATRG held its Research Symposium at University College Dublin, Ireland in July 1998, following the main WCTR meetings.

The symposium attracted 106 delegates from 17 countries. Additionally a plenary session yielded three views on the future prospects for European air transport.

The Proceedings

Once again, on behalf of the Air Transport Research Group, the University of Nebraska at Omaha Aviation Institute has agreed to publish the Proceedings of the ATRG Symposium in a three-volume monograph set.

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Volume 1, Number 1

Opening Remarks

Opening Address at the 1998 ATRG Dublin Symposium by T. Oum, ATRG President

Plenary Session: Irish Air Transport in the New Millennium

Air Transportation in the New Millennium: Opportunities in Competitive Markets by J. Lumsden

Irish Air Transport Policy in the New Millennium by J. Burke

Irish Air Transport Policy in the New Millennium by G. Cullen

Speakers: European Air Transport in the New Millennium

Air Transportation in the New Millennium: Opportunities in Competitive Markets by D. Andrew

Reflections on the European Aviation Industry by D. Kennedy

Session 1B: Airport Management, Economics and Pricing I

Benchmark Airport Charges, 1996 by A. de Wit & N. Cohn

Duty Free Shopping: Its Importance as a Source of Revenue in Spanish Airports by R. Rendeiro Martin-Cejas

Non-Parametric Measures of Efficiency at US Airports by D. Gillen

Access to Airports: A Case Study of the San Francisco Bay Area by E. Pels, P. Nijkamp & P. Rietveld

Session 2B: Airport Management, Economics and Pricing II

Integrated Airport Pavement Management and Facility Management Using Geographical Information Systems Technology by M. McNevey

The Integrated Airport Competition Model, 1998 by J. Veldhuis, I. Essers, D. Bakker, N. Cohn & E. Kroes

Airport Competition - Myth and Reality by T. Haughey

Volume 2, Number 1

Session 1A: Airline Networks & Airline Alliances, I

- Globalization of Airline Networks and Airline Alliances* by T. Oum
- Strategic Airline Alliances: Complementary vs. Parallel Alliances* by J. Park & A. Zhang
- Analysis of Airline Schedules Using Boeing's Decision Window Model* by C. Soncrant
- The Pros and Cons of Multi-hub Structures in the Airline Industry* by E. Romano

Session 3A: Airline Competitiveness, Financing and Economics

- Productivity, Prices and Profitability Trends in the World's Major Airlines 1986-1995* by W. G. Waters II, T. Ohm & C. Yu
- Enhancing Global Competitiveness: Benchmarking Airline Operational Performances in Highly Regulated Environments* by B. Bowen, D. Headley & K. Kane
- Measuring the Competitiveness of International Airlines: Implications for Deregulation and Liberalisation of Global Aviation Markets* by V. Tamms
- A Fuzzy Approach to Overbooking in Air Transportation* by M. Ignaccolo & G. Inturri
- Airline Overbooking at Aer Lingus* by J. Coughlan

Session 4B: Airline Networks & Airline Alliances, II

- Hard Choices and Low Prices: Positioning for Sustainable Advantage in the Airline Industry (The Case of Ryanair)* by T. Lawton
- Assessing Two Means of Promoting Interlining: IATA versus Alliances* by E. Aloy
- Deregulation and Scheduled Competition in Simple Airline Networks* by Y. Schipper, P. Rietveld & P. Niikamp
- The TGV Effect: Opportunities for Reconciling Sustainability With Aviation* by J. Patterson & A. Perl
- Policy Issues in the Express Carrier Sector* by M. D'Arcy

Volume 3, Number 1

Session 3B: International Experiences of Airline Deregulation

- Airline Deregulation in Australia: A Medium Term Assessment* by P. Forsyth -1
- Why Can't Japan Deregulate the Airline Industry and Open the Sky Immediately?* by Y. Sakakibara -2
- Toward a Market-Oriented Air Transport System?: Recent Developments in Russian Civil Aviation Performance and Policy* by J. Strong -3
- The Asian Economic Crisis and Its Implications for Aviation Policy in Asia Pacific* by A. Chin & R. Cain -4

Session 2A: Aircraft Financing and Airline Financial Performance

- Aircraft Financing Requirements Approaching the 21st Century* by K. Holden -5
- An Empirical Analysis of Japan's Domestic Airline Markets* by H. Murakami -6
- A Tale of Two Airlines: The Post Privatisation Performance of Two Caribbean Airlines* by J. Melville -7
- The Role of Capital Productivity in British Airways' Financial Recovery* by P. Morrell -8
- Airline Privatization: Does it Matter?* by Martin Staniland -9

Session 4A: Air Freight & Logistics

- Airfreight Demand: Responding to New Developments in Logistics* by J. Crowley -10
- Air Cargo Business Relationships* by R. Ferreira & N. Lenoir -11

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- 96-4 The Airline Quality Rating 1996
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ABOUT THE EDITORS

Dr. Aisling Reynolds-Feighan received her B.A. and M.A. in Economics from University College Dublin, Ireland, and her Ph.D. from the University of Illinois in 1989 in the field of Regional Science. She has been a College Lecturer at University College Dublin in Economics since 1990, where she teaches Transport Economics and Regional Science courses. Her main research interests are in air and road transport, with particular emphasis on the links between transport and regional economic development. She has published several studies examining the impacts of airline deregulation in the US and Europe including *The Effects of Deregulation on U.S. Air Networks* (Springer-Verlag, 1992).

Dr. Brent D. Bowen is Director and Professor, Aviation Institute, University of Nebraska at Omaha. He has been appointed as a Graduate Faculty of the University of Nebraska System-wide Graduate College. Bowen attained his Doctorate in Higher Education and Aviation from Oklahoma State University and a Master of Business Administration degree from Oklahoma City University. His Federal Aviation Administration certifications include Airline Transport Pilot, Certified Flight Instructor, Advanced-Instrument Ground Instructor, Aviation Safety Counselor, and Aerospace Education Counselor. Dr. Bowen's research interests focus on aviation applications of public productivity enhancement and marketing in the areas of service quality evaluation, forecasting, and student recruitment in collegiate aviation programs. He is also well published in areas related to effective teaching. His professional affiliations include the University Aviation Association, Council on Aviation Accreditation, World Aerospace Education Organization, International Air Transportation Research Group, Aerospace Education Association, Alpha Eta Rho International Aviation Fraternity, and the Nebraska Academy of Sciences. He also serves as program director and principal investigator of the National Aeronautics and Space Administration funded Nebraska Space Grant and EPSCoR Programs.

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The UNO Aviation Institute Monograph Series began in 1994 as a key component of the education outreach and information transfer missions of the Aviation Institute and the NASA Nebraska Space Grant & EPSCoR Programs. The series is an outlet for aviation materials to be indexed and disseminated through an efficient medium. Publications are welcome in all aspects of aviation. Publication formats may include, but are not limited to, conference proceedings, bibliographies, research reports, manuals, technical reports, and other documents that should be archived and indexed for future reference by the aviation and world wide communities.

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AIRLINE DEREGULATION IN AUSTRALIA: A MEDIUM TERM ASSESSMENT

51-03

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Paper Presented at the Air Transport Research Group Conference,
Dublin, July 20-21, 1998

ABSTRACT

In 1990, Australia deregulated its domestic air transport. Prior to deregulation there had been two trunk airlines which had been subjected to tight regulation, though there had been some liberalisation during the 1980s. International comparisons of costs and productivity suggested that there was considerable scope for efficiency improvement, and that deregulation would provide the impetus for substantial productivity growth. The early deregulation period saw two serious attempts at entry, but both of these failed, leaving the same two airlines dominating the market. Early studies have suggested some moderate, though certainly not large, productivity gains since deregulation; since these were done, there have not been major changes.

Available evidence in recent years is evaluated to determine how performance has changed over the post deregulation period, and how it compares to performance overseas, for example, in North America. Analysis is made more difficult by reductions in data availability since deregulation. Emphasis is given to changes in productive efficiency, since this is likely to be the main source of welfare gain, though other changes are also considered. The paper assesses whether the expected gains have been achieved.

The paper concludes with an interpretation of the results. The relatively modest improvement, coupled with a remaining gap in performance compared with overseas, raises the issue of whether competition between two dominant airlines is sufficiently strong to ensure minimum cost production. If so, there may be a lesson in this for other small to medium sized airline markets. Another explanation of the results may lie with the airline labour market; unlike what happened after US deregulation, there has been little change in airline labour markets, and possibly Australian labour market arrangements are hindering the achievement of overseas levels of productivity.

Introduction

In 1990, Australia deregulated its domestic airline market. From a position of having two, regulated, major airlines which dominated most of the routes, there are now two, unregulated, airlines which dominate the market. In the intervening period there have been two unsuccessful attempts at entry. Since the demise of the second entrant, now six years ago, there has been little change in the structure of the industry.

There were high expectations of gains from deregulation. Fares and unit costs were high, especially relative to those in North America, and it was considered that more competition, along with stronger incentives for cost minimisation, would lead to large increases in productivity. Initial studies, done soon after the demise of the entrants, indicated definite gains from deregulation, though the falls in fares were, at least in part, achieved through reductions in profitability (BTCE, 1993). There has been little analysis since, and this raises the question of how large the gains have been, and whether they are sustainable.

The objective of this paper is to undertake a medium term assessment of deregulation. It concludes that there have been measurable improvements in performance, and that productivity gains, as well as reductions in profitability, have enabled falls in real air fares. However, there still appears to be a large gap between the productivity performance of the Australian airlines and best practice overseas. The analysis also raises a number of questions. For example, granted there are only two airlines with little likelihood of large scale entry, why have they only been able to earn very modest profits? Another question is why have costs not fallen further? Some answers are suggested; while deregulation changed the product market, it did not change the airline labour market. Work practices and conditions changed little, and hence the productivity gains were limited.

The paper commences with a brief review of the background to deregulation, and of the early experiences. The next section explores how performance changed in the post deregulation period; real air fares, traffic growth, profitability, and productivity are all considered, and some simple international comparisons are made. In the following section, some of the puzzles which deregulation has raised are considered; some tentative answers are suggested.

Domestic Airline Deregulation: Background and Early Experiences

Australia had tight regulation of domestic aviation until 1990, when there was extensive deregulation. From the 1950s until 1990, the "Two Airline Policy" formed the regulatory framework for domestic aviation. Under this policy there were allowed to be only two major trunk airlines; these were the privately owned Ansett and the government owned Australian Airlines (formerly Trans Australia Airlines). There were a number of regional airlines, most of which were owned by the major airlines, and which were not allowed to compete at all on the trunk routes until the 1980s, and even then they were very restricted in terms of how and where they could compete (for a review, see BTE 1985).

The Two Airline Policy represented very detailed regulation. During its heyday, the airlines had to operate identical fleets, offer identical fares and cooperate with each other on fare setting. They tended to operate more or less identical schedules, though they were not required to do this. They did have freedom over which routes to serve, and how to develop their networks (for example, they were able to operate hub and spoke networks); their networks were very similar. They were subjected to price regulation, initially of a less formal kind, and later formal rate of return regulation.

Airline regulation was relaxed a little in the 1980s. The airlines were permitted to purchase different aircraft, and offer different levels of capacity; nevertheless, both retained close to 50% of the traffic

limited freedom to compete on trunk routes; one of these, East-West, was active in trying to expand its market share.

The airlines were strongly unionised, and have remained so. The unions supported the Policy, not surprisingly since it enabled airlines to pass on higher wages through higher fares. The unions also insisted on higher staffing ratios than were the norm in comparable overseas airlines. In the lead up to deregulation, during 1989, there was a protracted pilots' strike; the pilots were opposed by the airlines, the government and received no assistance from the union movement and ultimately they were defeated. During most of the years of the Policy, Australia was highly unionised, and there was central regulation of wages; since the 1980s unionisation has declined, and wages have been determined more at the enterprise level.

The Federal government determined, in 1987, to deregulate domestic aviation, and it gave the industry three year's notice. Thus deregulation came into operation in 1990. This decision came after a series of reports critical of the Policy, and was taken in an environment of extensive liberalisation throughout the economy. The lack of variety and availability of discount air fares, international comparisons of efficiency, and overseas experiences of deregulation all contributed to dissatisfaction with the Policy. While the incumbent airlines would have preferred the status quo, they had seen how the major airlines in the US had survived the onslaught of new competitors, and considered that they would be able to live with deregulation. Deregulation was not complete; foreign airlines were not permitted to compete on domestic routes, and the incumbent airlines were granted extremely long term leases of the terminals they used at most airports; this ensured that new entrants faced a major hurdle.

Before deregulation, it looked as if East-West would be a strong competitor for the major airlines. It had been expanding, and positioning itself as a leisure traffic carrier. However, before deregulation came into operation, it was bought out by the interests which owned Ansett. It was operated as a separate division for a time, but it was eventually merged fully into the larger airline. At the time of deregulation, there was one new airline, Compass, ready to enter. This airline entered with substantial capacity, and offered deep discounts. It quickly gained market share, but this was at the cost of a price war. While its costs were quite low compared to those of the incumbents, it was not able to sustain this strategy, and in late 1991, it collapsed. For the Compass story, see Nyathi et al, 1993). A second new entrant, Compass Mk 2, later appeared; while it was smaller and had a much more focused operating plan, it quickly ran into financial difficulties, and exited. The rapid collapse of two new entrants soon after deregulation has given a strong signal to potential entrants that entry into the market is extremely difficult, and made financial markets very wary of new airlines as an investment.

Since 1993, Australia has had two trunk airlines, with a few independent commuter airlines. The government airline, Australian, was merged into the international airline, Qantas, and the merged airline was privatised in 1995. British Airways has a 25% share Qantas. The domestic operations of Qantas represent a significant though minority share of its total operations. More recently, Air New Zealand has taken a half share in Ansett, which commenced limited international operations when Australian and Qantas were merged.

These experiences pose the question of what has been achieved by deregulation. The market has moved from one of regulated duopoly to unregulated duopoly, and it is unlikely that it will change from this in the new future. There is the issue of whether there have been real gains from deregulation, and whether any such gains have been as large as might have been expected.

Evaluating Airline Deregulation

There have been some studies of airline deregulation in Australia, but most of these were done soon after it began, and thus do not pick up the medium to longer term effects of the change. The

attention to service quality issues. It concluded that there had been net welfare gains from deregulation. The entry by Compass was studied by Nyathi et al (1993) and by the Trade Practices Commission (1992). More recently, the Australian Competition and Consumer Commission (1996) has examined its own air fare data. However, there has been little by way of comprehensive evaluation of deregulation since the BTCE study.

Data Availability

While the Australian airlines have in the past been subjected to a number of time series and cross section studies of performance and productivity, it is becoming increasingly difficult to replicate these because of data non availability. This is due, in some cases, to some data series no longer being collected, mergers and erratic reporting. There are series of air fares, but since 1996, these have ceased. Information from annual reports of airlines is becoming increasingly less useful for studies of domestic aviation as there are no purely domestic airlines, apart from small commuter operators, left. The major airlines only report very limited information about their domestic operations. The airlines have not been providing regular or extensive statistical information to international agencies such as ICAO.

Some air fare data were published up to 1990, and in that year, (the predecessor to) the Australian Competition and Consumer Commission began collecting detailed fare information on the 21 major routes. In 1996 it ceased collection. While it is still possible to collect data on fares such as economy fares from primary sources, these fares have ceased to be useful as a proxy for air fares in general. Information on the use of different fares is generally not available, though some limited occasional studies have been done. Data on domestic airline traffic have still been published. Strictly speaking, there are no data available on costs, revenue or on labour used in the domestic market- thus it is no longer feasible to estimate total factor productivity for time series of cross section purposes. At this stage, one airline, Ansett, is primarily still a domestic carrier; hence it is still possible, with some inaccuracy, to use its performance as a measure of performance in the domestic market. Australian Airlines data are available until 1991-2, a rather atypical year because of the presence of Compass. Qantas now publishes a limited amount of information about traffic and earnings, though not sales, in its domestic operation. The upshot is that it is feasible to make some measures of performance of the domestic airline market, but such measures are going to become increasingly unreliable.

Most studies of deregulation in Australia take the beginning of deregulation at the end of 1990. While formally, this was the start of deregulation, it is best to not rely too heavily on this date to take measurements from. For a start, the industry was still recovering from the 1989-1990 pilots' strike, and demand had not fully recovered; the boom in air travel in 1991 is partly explained by recovery from the strike. Secondly, the airlines had been informed about deregulation in 1987, and were preparing for it from about 1988 onwards. Thus, where data allow, it is preferable to regard the "start" of deregulation as around 1988.

Real Air Fares

Until 1996, data on average air fares are available. During the decade before 1990, air fares had remained fairly constant in real terms, even though improvements in technology might have suggested that some real falls could have been expected. Air fares fell, in real and nominal terms, in the immediate aftermath of deregulation. This was the period when Compass was present in the market, and a price war was under way. After Compass I and II had exited, fares rose again; however, they rose to a level below that of 1990. Since 1992-3, real air fares have changed very little. Overall, in the 1990-96 period, fares fell by 20-24% (Table 1). On these figures, it would seem that deregulation has made quite an impact.

The interpretation of these figures has been challenged by Quiggin (1996) who argues that there

have fallen. The fall in the average has been effected through a shift from the high priced to the low priced categories. Using Paasche and Lasperes indices, he notes that fare indices have changed little since deregulation-fares have fallen by about 1% on average. Quiggin concludes that deregulation has had only a very minor effect on fares.

This argument fails to recognise that the main impact of deregulation has been on the availability of discount fares. Discount fares are quantity constrained; partly for price discrimination reasons, and partly so that they can be used to fill aircraft more effectively. Deregulation has made discount fares much more readily available. The index technique, used by Quiggin, is only correct if all of the fares are available on an unconstrained basis at the beginning and end of the period. This is not the case with air fares. For many leisure travellers, discount tickets, with conditions attached, are almost perfect substitutes for the more flexible, though much more expensive, full economy tickets. Thus, while there has been some reduction in the average quality of the services on offer, this has not been great; the reduction in average fare per kilometre is a slight, though only slight, overestimate of the fall in real effective air fares.

Another way of examining the quality issue is to look at load factors. Load factors are a measure of the average flexibility of air fares on offer. They can be increased if more restrictive fares are sold, and account for a greater proportion of the traffic (at the limit, a scheduled operator becomes more like a charter operator, with little flexibility in travel). If the Quiggin view were correct, we might expect to see a significant rise in load factors, being achieved by a greater proportion of less flexible, and hence lower quality, tickets being sold. As it is, there is very little change in load factors. These were high before deregulation (at around 70% to 75%) and they have remained so since.

Another possible source of inaccuracy may come about from a shift between short haul and long haul traffic. Since deregulation, the greatest reductions in average air fares have come in the long haul routes (see Table 1); these are the routes with the lowest per kilometre fares. Traffic growth has been greatest on long haul routes, partly as a result of the greater price reductions. To this extent, the movement in average fares per kilometre will overstate the real reduction in air fares. It is difficult to measure how serious a qualification this is likely to be. The average passenger stage length of Australian Airlines rose, though not by very much, over the 1987-88 to 1991-92 period.

The overall assessment on air fares must be that they declined fairly significantly in the post deregulation period, though that the fall in average per kilometre fare is a small overestimate of the fall in real effective air fares.

Traffic Growth

If deregulation has resulted in lower real air fares, it would be expected that traffic would grow strongly. In fact, one of the most prominent features of the post deregulation period has been a sharp and sustained boom in air travel. Traffic grew by nearly 50% in 1991, the period of the price war, but it has continued to grow since then. A better base for calculation is 1988, since the industry was still recovering from the pilots' strike and the economy was in recession in 1990. Over the seven year 1981 to 1988 period, covering boom to boom in the economy, traffic growth was 3.3%, while in the 1988 to 1995 period, also boom to boom, growth was 7.7% (Table 2). This suggests that deregulation has had a major impact through lower fares. However, alternative explanations of the boom in air travel must be canvassed.

One explanation is that there could have been much more effective price discrimination, and that this may have led to higher output. Fares used by low elasticity travelers (business travelers using economy fares) have risen, and fares used by high elasticity travelers (leisure travelers using discount fares) have fallen and become more freely available. This would have resulted in an overall increase in traffic. This however can be regarded as a result of deregulation, and it is also

Normally, this could have been expected to result in increased profits, but in the more competitive environment, airlines were not able to raise profitability (in fact, profitability fell- see below). In summary, some of the growth in traffic can be ascribed to fare structure changes, not just falls in fares; this is a desirable outcome of deregulation however.

Another possible explanation of the growth in domestic traffic has been the growth in international tourism to Australia. International tourists also use the domestic airlines; however they remain a small proportion of total traffic. In 1993 the BTCE made an estimate of the propensity of Australian residents to use domestic airlines; it concluded that there had been a sharp increase in this propensity by 1992. In Table 3 the BTCE estimates are updated to 1995, using the methodology developed by the BTCE. It suggests that the propensity to travel has further increased.

It is difficult to find any alternative explanations of this boom in domestic travel. Population has been increasing only slowly, and GDP per capita has been growing more slowly than in the 1980s. International air traffic from Australia has not been growing nearly as rapidly. All of this strongly suggests that falls in real effective air fares, coupled with changes in the structure of fares, have been behind the boom in travel.

Profitability

Deregulation has been followed by a sharp drop in the profitability of the two major airlines. The 1980s were a period of high and sustained profitability for the airlines; the only difficult period, before the pilots' strike, was a period of recession early in the decade. Ansett was particularly profitable. In the immediate post deregulation period profitability fell; this was to be expected given the price war with Compass, and a recession in the economy. After the exit of Compass, fares rose, though not to their previous level. This was also true of profits. As a group, the airlines have been rather unprofitable since deregulation.

Good measures of profitability of domestic airlines have been difficult to come by, since sales revenue and assets data are no longer published. In Table 4 data are presented on Earnings before Interest and Taxation; this is not a pure measure of profit, and it can be affected by leasing policies. Granted these limitations, it suggests that profits have been, at best, quite modest since deregulation. Airlines are larger, but they are not earning as much profits. This is evident in the measure of real EBIT per revenue passenger kilometre; this has fallen significantly (. In spite of facing limited competition since 1992, the airlines have not been able to restore their profits.

Productivity Trends

While air fares have fallen, this might not be a result of a real improvement in the productivity of the airlines; it could be because profits or input prices have fallen.

There is evidence of increasing labour productivity. Over the period 1987-88 to 1991-92, labour productivity in Australian Airlines increased by about a third (Table 5). In the later five year period to 1996-97, labour productivity in Ansett grew quite rapidly; however some of this improvement must be ascribed to the inclusion of long haul international routes happening over the period. Labour productivity measures are partial and are prone to error; for example when there is a trend towards contracting out.

Another approach is to use information on unit costs and input prices to estimate trends in total factor productivity. No direct data on unit costs of domestic traffic are available, but unit costs can be estimated from output price (fare) and profitability data. Changes over 1990 to 1996 are summarised in Table 1. EBIT per RPK was around 3c in the 1980s and 1c in the 1990s; were it not for the decline in profitability, fares per RPK might have been about 2c higher in 1996. Thus the adjusted fare, allowing for the 1980s return on capital, would have been 20c per RPK. Deflating by

Input prices seem to have been approximately tracking the CPI. Avtur prices have moved around, and they have increased more than the CPI. Data on airline wages are not available, but economy wide indicators, such as average weekly earnings, have kept pace with the CPI. There have not been major swings in exchange rates and the prices paid for equipment over this period. Overall, during this period, movements in the CPI are probably a good proxy for movements in the input price index.

Thus, a reasonable measure of the change in total factor productivity over the 1990-1996 period is a 14.5% gain. This suggests that productivity has definitely grown, though it is not a spectacular growth for a six year period for the airline industry. At 2.3% pa it is less than that achieved (2.9%) by the European carriers over 1986-93, but more than that achieved by US carriers (0.7%) (Oum and Yu, 1995). The Australian carriers were perhaps between the two groups in terms of TFP, though probably closer to the European carriers. If unit fares are a measure of unit costs in the 1980s, the productivity growth in the post deregulation period has been significantly greater than before.

International Comparisons

Ideally it would be possible to make comparisons of total factor productivity, adjusting for different output mixes, or to embody the domestic Australian airlines in a cross country cost or production function analysis. Data limitations prevent this being done. It is possible to make some crude comparisons of unit cost and productivity.

Some estimates of cost per tonne kilometre available and performed are given in Table 6 for 1995. The cost estimates for Ansett would include some non airline operations, and also include some international airline operations. Costs are given in US\$ in 1995, the official Australia-US exchange rate fairly closely reflected purchasing power. Ansett's unit costs are considerably higher than those of Qantas (including domestic operations, but with most of its output being international) and those of other airlines, several of which have low stage lengths. The difference between Ansett and the other airlines is unlikely to be explained fully by output mix. Unit costs for the domestic component of Qantas are likely to be similar to those of Ansett, though probably a little lower (currently Qantas faces the same output prices, but makes larger profits on its domestic services).

This pattern is also reflected in differences in labour productivity. Labour productivity in 1993, as measured by tonne kilometres performed, is presented for a number of airlines, including several short haul airlines, in Table 7. Data for Australian Airlines is presented for 1992, its last year of independent existence. Even allowing for the fact that some non airline employees may be included for Ansett, its labour productivity is very low, even in comparison with airlines which are not regarded as being especially productive.

Prior to deregulation, it was considered that the domestic airlines in Australia were significantly less productive than comparable overseas airlines; for this reason it was expected that the gains from deregulation could be large. These figures suggest that while deregulation has improved productivity, there is still a wide gap between the productivity of the Australian domestic airlines and overseas best practice.

Domestic Deregulation; Some Stylised Facts and Questions

The discussion above suggests some stylised facts about deregulation.

- Air fares have fallen in real terms since deregulation, though by a little less than the fall in average fare per passenger kilometre.
- Traffic has boomed, mainly as a response to lower fares, and especially the greater availability

- Even with limited competition since 1992, airline profitability has been poor.
- Total factor productivity has increased by about 14%; this reflects a faster productivity growth rate than in the 1980s. Some of the fall in air fares has been made possible by the fall in profitability.
- The productivity of domestic airlines still lags well behind that of comparable overseas airlines.
- There has been relatively little change in performance since 1992, after the exit of Compass.

These facts in turn give rise to some questions.

- Why, in the presence of very limited competition, has the profitability of the airlines been so modest?
- Why is labour productivity so low, and why has there been such limited catch up with overseas airlines?

Interpreting the Results of Deregulation

The answers to the two questions raised above are far from obvious. It is worth exploring the possible answers with a view to suggesting whether further changes in the market are likely.

Duopoly Behaviour

The Australian airlines have moved from a situation of regulated duopoly to unregulated duopoly, though their behaviour since deregulation does not seem typical of aggressive, profit maximising duopolists. Profits have, at best, been modest, and prices have been close to costs. With the long history of cooperative behaviour, it might have been expected that the airlines would have been able to make more effective use of their market position.

One possible explanation might be a struggle for market share; it could be that the current outcomes are temporary, and that fares will be increased once an equilibrium has been established. There has been some fight for market share. At the beginning of the post deregulation period, Ansett had a greater share of the traffic on competitive routes than Australian. After the merger, Qantas domestic scheduled a significant amount more of capacity, and it now has a greater share than Ansett. Its weapon appeared to be more one of increased frequency and convenience rather than of price, since there was no price war at this time. It could be that the struggle for market share is holding back fare increases, though both airlines would probably do better, in the long run as well as the short run, if they raised fares somewhat.

Fear of competition is not likely to be restraining price behaviour. There has been no entry for six years, and new entrants are not very likely in the near future. Should a new entrant appear, it is likely that it would seek out niche markets rather than mount a full frontal assault on the market as did Compass I. If need be, the incumbent airlines can reduce prices quickly if competitors appear, and they do not need to keep prices down in the absence of entry. Until recently, there has been price monitoring; however this was not price regulation, and the airlines were not constrained in the pricing decisions.

Another possibility is that the low fares are a remaining effect of the Compass price war. Possibly, having reduced prices, the airlines are finding it difficult to raise them again. This is not likely

and it is possible for them to continue to raise prices in an inconspicuous manner, by making discount fares more restricted and difficult to get- they do not need to raise published fares.

In one way the airlines are making effective use of their market power; this is through keeping costs higher than might be the case if there were more competition. As noted in the previous section, there is scope for the airlines to reduce costs further. They have not been under strong pressure to do so, and the incentives for cost reduction are possibly not great. The airlines are thus using their duopoly position to enable higher staffing levels, and better working conditions, than would otherwise be the case. The duopoly rents are being enjoyed by the workforce. This however still does not explain why prices are as close to costs as they are; even if costs are higher than the minimum, there would be scope for the two airlines to charge above actual costs and generate some rents for themselves.

The two airlines do appear to be somewhat tacitly cooperative in specific city pair markets. Fares in some markets, dominated by low elasticity business travel, such as those out of Canberra, are relatively high, while those dominated by leisure traffic are low. At the route market level, the airlines are not competing fares down to cost. Overall, however, they are together scheduling sufficient capacity to keep prices close to costs. The airlines are less cooperative at the capacity scheduling stage than they are at the route pricing stage. This is in spite of the fact that their route networks, schedules and frequencies are very similar; they are under no illusion that they are not involved in direct head to head competition.

Overall, the two airlines are more competitive between each other than would have been expected, especially given their history of cooperation. The reasons for this are not clear. The worry that they would use their market power to earn large profits has not materialised. However, the presence of market power has given them scope to keep costs higher than might be achieved in a more competitive environment.

Explaining the Productivity Gap

Overseas experience suggests that the Australian airlines could operate with much less labour, and achieve much lower per unit costs. It was the expectation of major gains from this source which was one of the main motivations for deregulation. Current experience, especially the limited change since 1992, suggests that the environment in which the domestic airlines operate is not such as to force them to maximise efficiency.

The airlines do have an incentive to minimise costs, and to convert cost savings for their owners. Both airlines are now private, and both have overseas private airlines as major shareholders. In both airlines there is a recognition that cost savings are possible, and both are currently attempting to cut costs. Their progress in this respect seems to be slow. On the other hand, neither is forced by pressure of competition to lower its costs. They seem to be taking advantage of their duopoly position by allowing costs to be higher, rather than by putting up prices and achieving greater profits.

It is possible that domestic airlines in Australia face operating disadvantages and that higher unit costs are inherent. This is rather implausible though. They operate with very good weather, and experience delays at only one airport, Sydney. The international division of Qantas has been a relatively efficient performer in comparison with other international airlines. The levels of service quality offered by the domestic airlines may be higher than that offered in other domestic systems, but this is unlikely to be much of the explanation.

Probably the main difference between the Australian and other domestic airline systems lies at the labour market level. Labour market conditions and regulation are different. In spite of the failed pilots' strike, the airlines are strongly unionised, and there is also centralised labour market

same levels of productivity. This is not likely to be the result of generally lower efficiency of labour in the Australian economy, since productivity in other industries is high by international comparisons.

The airline labour force is still in a strong position, in spite of deregulation. There is a monopoly of supply of critical labour inputs to the industry. The workforce can use this power to insist on high pay and good working conditions. It is possible that the Australian workforce has chosen to enjoy its monopoly rents through easier jobs rather than higher pay, and achieved this through having more staff per task, and hence lower productivity. This may be the result of an efficient, or an inefficient, bargain at the labour market level; the cost, in terms of increased effort, of achieving higher pay through greater productivity may not be worthwhile.

The airlines may not be willing to challenge current arrangements. Any cost reductions they achieve will probably be matched by their competitor, and thus will not be converted into profits. On the other hand, if they challenge the situation, they could be faced by costly strikes and lose market share to their competitor. Deregulation may have lessened market power at the product market level, but it did not reduce market power at the airline labour market level.

It is interesting to contrast the Australian experience with that in the US. The Australian airlines have not been challenged in the same way that the incumbent major airlines were in the US. These airlines were faced with multiple entry by low cost carriers; they were able to achieve their lower costs partly by paying their (non union) staffs lower pay, but they were also able to achieve less labour using work practices. To survive, the incumbent airlines were forced to conclude new deals with their workforces; these embodied higher productivity, and sometimes lower pay. Entry, at the airline or product market level, put pressure on at the airline labour market level. The airline employees' market power was weakened; employees were forced to accept heavier work loads for less pay. (To the extent that work loads became heavier, the real productivity gains in the US may have been overstated).

Thus a good deal of the answer to the productivity comparisons puzzle probably lies in the airline labour market. In Australia there is still strong market power present, the use of this leads to high staffing requirements. There may be some possibility for airlines to achieve productivity gains, if they are prepared to pass some of these on in the form of higher pay to their employees. However, their ability to do this may be limited, because workforces are often conservative, and often they are unwilling to change. Negotiated improvements in productivity are likely, but they will take time in coming.

Another possibility is that the workforce's market power may be challenged. This could happen if there were successful entry by low cost airlines, which achieve their low costs by having more efficient work practices, and perhaps by paying less. At present this does not seem very likely.

Conclusions

The analysis here resolves an number of issues, but it poses additional ones. The initial assessment of deregulation is confirmed; there have been gains, but there have only been minor changes since 1992, when the competitive episode in the industry ended. These results are preliminary, but they are not likely to be changed much by more detailed analysis. The changes that have taken place have been attributed to deregulation; there is always a problem of identifying the appropriate counterfactual, but there is nothing to suggest that the same productivity growth or increase in availability of low fares would have taken place in the absence of deregulation. Perhaps the clearest manifestation of deregulation has been the boom in air travel, which cannot be explained by other factors. All of this refutes the view, now being expressed, that deregulation has changed little, and produced only minimal reductions in fares.

The paper suggests that both the fears and hopes have not materialised. There was a fear that there would be no new competitors, leading to unregulated duopoly with high fares and profits. While there is a duopoly, it has not resulted in high fares; this does pose a question of why the airlines have not been able to make more effective use of their market power. There was a hope that deregulation would lead to productivity levels comparable to those of the best systems overseas. This has not happened; there is still something of a gap to be made up, and current progress is not rapid. This poses the question of why the airlines seem to have stabilised at lower productivity levels than achieved elsewhere. The answer to this may lie in the nature of the airline labour market in Australia; this market has been little changed by deregulation.

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Table 1: Air Fares (Cents per passenger kilometre) 1990-96

Distance	September 1990	September 1996	% Change
0-500 km	32.67	33.6	+ 3.1
501-1000 km	24.5	22.9	- 6.5
1001-2000 km	16.0	15.5	- 4.1
2001-4000 km	13.1	11.5	- 12.2
Average	19.7	18.0	- 8.6
CPI			+ 16.3

Source: ACCC Journal, September 1997, p50

Table 2: Traffic 1981-95 ['000 Revenue Passengers]

		% increase per year
1981	11,388	3.3%
1988	14,321	7.7%
1996	24,073	

Source: BTCE, *Transport Indicators*, various years; BTCE (1993)

Table 3: Propensity to Travel, 1982-1995

Year Ending June	Short Term Foreign Visitors	Estimated Domestic Trips By Visitors	Estimated Domestic Trips by Residents	Australian Population	Ratio of Trips/Population
1982	950,172	712,629	10,537,475	15,184,200	0.69
1988	2,239,490	1,679,618	11,929,792	16,518,400	0.72
1992	2,519,700	1,889,795	16,048,525	17,528,900	0.92
1995	3,436,000	2,577,000	20,845,000	18,054,000	1.15

Source: *Transport Indicators*, various years; BTCE(1993)

Table 4: Airline Profitability 1981/2 - 1996/7

Year	Earnings before Interest and Taxation			
	Ansett (\$m)	Australian/ Qantas Domestic (\$m)	Total EBTT/ RPK in Current \$	in 1990 \$
1981/82	106	24	1.31	2.40
1982/83	116	24	1.55	2.55
1983/84	223	31	2.74	4.21
1984/85	180	55	2.39	3.53
1985/86	250	68	3.00	4.08
1986/87	297	72	3.25	3.87
1987/88	391	125	3.31	3.83
1988/89	225	164	2.97	3.21
1989/90	281	40	3.38	3.38
1990/91	- 7	182	1.34	1.27
1991/92	<u>82.5</u>	12.5	1.24	1.16
1992/93	191.7	-	-	-
1993/94	328.8	10.6	2.10	1.90
1994/95	198.6	133	1.35	1.19
1995/96	80.9	164	0.89	0.77
1996/97	96.6	168	0.90	0.77

Sources: Airline Annual Reports; B.T.C.E. Transport Indicators, various years; ACCC (1996); BTCE (1993)

Table 5: Airline Labour Productivity, RPK per Employee (000)

Year	Australian	Ansett
1987/88	594	-
1988/89	642	-
1989/90	421	-
1990/91	590	-
1991/92	838	-
1992/93	-	665
1993/94	-	741
1994/95	-	824
1995/96	-	860
1996/97	-	997

Table 6: Unit Costs, 1995, Selected Airlines

Airline	Cost/ATK US¢
American	40.1
U.S. Air	65.5
America West	42.5
Canadian	35.8
All Nippon	131.4
Qantas	52.8
SAS	112.5
Ansett	115.1

Source: Annual Reports; ICAO. Digest of Statistics: Financial Data

Table 7: Labour Productivity, 1993, Selected Airlines

Airline	Passenger Stage Length	RTK (000)/ Employee
American Airlines	1566	184
U.S. Air	866	122
Canadian	1630	171
All Nippon	1034	289
Qantas	4257	292
Lufthansa	1071	218
SAS	702	124
Ansett	1001	76
Australian (1992)	975	92

Sources: Annual Reports; Oum and Yu (1997)

Why can't Japan deregulate the airline industry and open the sky immediately?

Yasuo SAKAKIBARA

I A brief history of deregulation in Japan

1. Dividing the market into three airlines (1970)

- (i) Many small regional airlines were born soon after the reopening of civil aviation in 1953.
- (ii) JMOT recommended (an administrative guidance) that small ones be merged
- (iii) Unwritten "constitution" (an understanding of a cabinet meeting) divided the market into three airlines.

JAL: international and domestic trunk routes

ANA: domestic trunk and local routes

TDA: (now JAS): local and domestic trunk routes

- (iv) How powerful was the "constitution?"

2. Some relaxation of the "constitution"(1985)

- (i) Complete privatization of JAL
- (ii) Double and triple tracking allowed in domestic routes with heavy demand
- (iii) ANA and JAS allowed to go international
- (iv) JMOT's discretionary power increased
- (v) Airport capacity limitation, good or bad?

3. More relaxation in domestic market (1995-97)

- (i) Room to play in fares
- (ii) Double and triple tracking expanded
- (iii) JMOT announcement in 1997 that market intervention would be abandoned on domestic routes by 1999.
- (iv) New entry on a large scale impossible under airline oligopoly and under airport capacity limitations

II Aviation issue as a thorn in U.S.-Japan relations

1. How unequal was the unequal treaty?

- (i) Landing and takeoff points
- (ii) Issue of unlimited "beyond" right
- (iii) Japanese passengers are 2/3 of the total and American carriers have 2/3

of the total on the trans-Pacific routes

(iv) Market forces vs. inequality

2. New agreement of 1998

(i) Is it closer to "open sky"?

(ii) JMOT says that some inequalities amended

(iii) Perception gaps in the U.S. and Japan

(iv) Asian economic crisis and unattractive "beyond"

III Why does JMOT fear the inevitable?

1. Cost differences between Japanese and U.S. carriers

(i) Airport capacity limitations and very high charges

(ii) Fluctuations in currency exchange ratio

(iii) Fear of unemployment

2. World mega-carriers and anti-trust

3. Nature of Japanese bureaucracy... "A wise man does not hurry history" (Adlai Stevenson) in more impatient world

(i) Mediator rather than enforcer

(ii) Policy which makes the least number of people unhappy

IV Towards more opened sky

1. U.S. relations

(i) Aviation issue and trade issue

(ii) Yen vs. dollars

(iii) Continued "foreign pressure"

2. Asian conditions

(i) How long does Asian economic crisis continue?

(ii) Possible excess capacity at Asian airports

(iii) How fast do other countries in Asia go to open sky?

3. Global Alliance and Code sharing to bypass government controls

1 A brief History of Deregulation in Japan

When Japan was allowed to reopen civil aviation and Japan Airlines (JAL) was reestablished in 1953, no Japanese government official, no member of the government committee on civil aviation, and nobody in the airline business could imagine that the new JAL would become profitable in a few years and that it would grow to be one of the established air carriers of the world. Therefore, the civil aviation policy of the Japanese Ministry of Transport (JMOT) was geared entirely to strengthen JAL's position as Japan's "flag carrier."

The JAL's performance improved with "the Jimmu boom" of 1956 (Jimmu was the first legendary emperor of Japan, and the term Jimmu boom means boom without any precedent). JAL made a profit from '55 to '61 and paid dividends to private stockholders in '60 for the first time (The government owned the majority of its stocks)¹.

On the other hand, none of the many small regional airlines born after the reopening of the civil aviation were making money. The JMOT recommended (an administrative guidance)² that small ones be merged into larger ones. A series of mergers followed and two airlines emerged: All Nippon Airways (ANA) and Toa-Domestic Airlines (TDA...later changed to Japan Air System, JAS).

Soon after the three major airlines, JAL, ANA and TDA, came to existence, an understanding of a cabinet meeting was issued (1970).

This understanding came to be called "the constitution" of civil aviation because it completed the regulatory system and because it was strictly observed, however informal the regulatory dictations were. What the constitution did was to divide the market into three airlines.

JAL: international and domestic trunk routes

¹ The author taught the transportation economics for the first time in '58 at Doshisha University. In a lecture, I predicted that soon the Japanese would be able to go abroad with the money received as a one-time bonus. No student believed my words. I argued that income elasticity of air demand had been high and Japanese income was rising very fast, that technological improvements in air transportation would continue to be very fast and therefore, the relative cost of air travel would severely come down, and, finally, that the Japanese would want to know more things foreign and foreigners want to know more about Japan.

² "Administrative guidance" is a technique used often by the Japanese government. It is a mere recommendation or suggestion (therefore not based on a law and thus the government has no power to enforce it), but it has had an almost similar effect as regulations based on laws. Japanese businesses hesitate to sue the government, because they are afraid of a bad reputation and possible retaliation by the government. (On the other hand, private citizens occasionally sue the government.)

ANA: domestic trunk and local flights

TDA (JAS): local flights

Since fares and new entries were regulated, these three airlines have all become regulated monopolists. Yet they were all dissatisfied because they were deprived of the chance to expand to other markets. JAS experienced financial difficulties, since it had to operate unprofitable local routes, and, therefore, it was allowed to operate a few trunk lines to make cross-subsidies possible. ANA's pleas to operate international routes were all denied. JAL was allowed by the "constitution", to run domestic trunk routes because those were JAL's original routes and because the JMOT wanted JAL's international position to be strengthened by cross-subsidization between international and domestic routes, yet the JAL always wanted to enter ANA's monopoly trunk markets³.

In 1985, the JMOT took a step to relax the "constitution." The government committee on transport policy recommended the adoption of the following three measures.

- (i) JAL should be entirely privatized.
- (ii) Double and triple tracking should be allowed in domestic routes with heavy demand (more than 1 million passengers for triple and 700,000 for double).
- (iii) ANA and JAS should be allowed to have international routes.

We do not know how far the JMOT was recognizing the necessity of competition in domestic and international routes in adopting these measures. In the case of international flights, it was most probably motivated by American demand that more American airlines be allowed on trans-Pacific routes. If Japan had to yield to the American demand, it would be better to

³ The market division has been a very touchy subject. In 1978, I wrote a paper entitled "Open Sky and the Grandfather Clause" (in Japanese) in which I made a few policy recommendations for more competition and an eventual open sky. The paper had three specific points that later in 1985 the JMOT would adopt, namely

- (i) complete privatization of the JAL,
- (ii) plural international carriers,
- (iii) free entry to the domestic market.

As a result, I became unpopular among the airlines. The JAL did not like other airlines entering the international markets, ANA did not like JAL and JAS entering their monopoly trunk routes and JAS did not like to have new entries to local monopoly markets. They all wanted to keep their monopoly markets intact and to enter other markets. They must have calculated that the loss caused by losing monopoly markets would be larger than possible gains from entering other markets. Furthermore, the JMOT did not like to be told what it should do. As a result, all were unhappy with me.

have multiple airlines to fly trans-Pacific routes to achieve an equal right.

Government capital had accounted for 70% when JAL was established, but with more capital raised in the stock market, its share had declined to 33% by this time. Thus, complete privatization was a natural step to take.

However these measures did not decrease the discretionary power of the JMOT. Because of limited airport capacity, the JMOT could continue to dictate the routes which airlines should fly. Airline officials had to go to the JMOT even more frequently than before to acquire new routes.

Japan had some 150 airports during the World War II. When it reopened civil aviation, there were only nine remaining. Most of the other airports were turned into rice-paddies to feed starving Japanese after the War. Today, Japan has some 90 airports, mostly local ones, because the JMOT built the airports wherever the land was available, not necessarily in the most advantageous locations⁴.

The airport shortage definitely contributed to keep the monopoly position of the airlines and helped maintain the discretionary power of the JMOT at the expense of the consumer.

In 1995-1997, some more relaxation measures were taken. By this time, it was clear to everybody what would happen after deregulation and "open sky" because of American experiences. The JMOT figured that step by step deregulation instead of one-time deregulation would achieve what Americans had achieved, while avoiding the confusion Americans experienced. It decided to set a fare ceiling on each route and allowed airlines to discount from it. Some oligopolistic fare competition started involving hotels and other related facilities in tour packages, discounts for early purchase of tickets, etc., in domestic routes. The number of passengers needed for double and triple trackings was reduced, and the routes served by plural airlines increased. This move took away some profits from airlines. And, finally, in 1997, the JMOT announced that the market intervention would be abandoned totally in domestic routes by 1999. That means that any airline can enter any market if it applies to the JMOT; this includes new entrants. The JMOT now seems to be in the mood of encouraging new entrants in the domestic market.

However, well-established oligopoly and the capacity limitation at major airports make it impossible for other airlines to enter domestic market in a

⁴ Because of the high land price in urban areas, because of the lack of the concept of eminent domain, and because of the shortage of funds for airport construction, the JMOT tended to build new airports where the land price was reasonable and where popular opposition to the construction of the airport was minimal. Large, international airports in urban areas were hardest to construct as the case of the Narita Airport symbolized.

large scale fashion. Recently, one of the major airlines even proposed competitive bidding for the right to use newly increased slots. It may have done so, knowing that the proposal will never go through the JMOT. The JMOT actually reserved some slots from 50 new slots created by the relocation of a runway at the Haneda Airport for newly established airlines. The JMOT did the same for the old Osaka Airport when the municipalities surrounding the airport agreed to increase the number of flights by 50. However we will have to wait many more years till airport capacity limitations are eliminated.

II Aviation Issue as a thorn in US-Japan Relations

The U.S.-Japan economic relations have gone through periods of antagonism as the two countries came closer. However, even in those periods the issues between the two countries were more emotional than real, more political than economic, and were often discussed more loudly than necessary. As we end the '90s, an era different from the two previous decades, the U.S. has regained self-confidence in its own economy while Japan has lost it. With this change, emotions on both sides have subsided. Japan bashing has become a thing of the past and Japan passing is the mood of the day since Japan is no longer considered a threat to the U.S. economy. Japanese who were often labeled as arrogant, now have nothing to boast about.

We can not be too optimistic about this situation, especially because the trade imbalance is widening as the yen falls. If the Japanese economy picks up and the American economy slows down, the trade issue will be ignited again.

For the last two years, however, transportation and communications have become an issue. Transportation and communications were considered to be different issues from general economic relations, or trade. I do not know why. One reason for it may be because they were handled by other divisions of bureaucracies. Americans pointed at cargo handling in the Japanese seaports and termed it as unfair. Japanese admitted the truth in essence but would never say so. Cargo-handling workers are tightly unionized like onetime Teamsters, and the government can do very little to change practices. American demands are in a way welcome since they can be used it as "foreign pressure" to achieve a domestic policy goal.

Another issue that was more real, was, of course, aviation. American policy has been consistent after 1980, demanding "open sky" in Japan. In my judgement, Japanese policy towards the U.S. on this matter is more

emotional or at least it involves evoking nationalistic feelings in order to turn negotiations to its advantage. There is a fear on the Japanese side that the American position may have a strong appeal to the average consumer in Japan. Thus, the Japan side insisted on the amendment of unequal treaty concluded right after the World War II before accepting "open sky."

It is true that there is a certain inequality in U.S.-Japan air agreements, real and imaginary. However, the Japanese insistence on amendment has been tenuous and often resembled similar eagerness of elder statesmen of the late Meiji Period who tried everything to amend unequal treaty concluded at the time of the Restoration.

The American side has argued that there is no inequality in the agreement and that Japan should honor it. And even if there is inequality in the agreement, it will disappear once and for all if both sides adopt "open sky." In the eyes of American negotiators, it looked as if Japan was trying to earn advantage for Japanese carriers.

Then, how unequal was the U.S-Japan air agreement before the new agreement was concluded in March 14, '98.

i) The number of incumbent carriers:

Japan	1	(JAL)
U.S.	3	(NW, UA, FedEx)

ii) Landing and take off points

In Japan	American carriers	no limit	(7 points in use)
	Japanese carriers	limited	(7 points in use)
In the U.S.	American carriers	no limit	(24 points in use)
	Japanese carriers	limited	(11 points in use)
"beyond" rights	allowed only for incumbents		
	Japanese carriers	limited	(1 point in use)
Actual "beyond" flights	American carriers	no limit	(12 points in use)
	Japan	2 a week	
	U.S.	179 a week	

iii) Charter flights

Japan	limited	(200 a year)
U.S.	limited	(400 a year)

As the result of these inequalities, Japan argued that Japanese carriers were losing their share of trans-Pacific flights. Japan argued that two-thirds of the passengers were Japanese but two-thirds of them were carried by American

carriers.

The American side argued that it was simply the result of market forces. American carriers offer cheaper fares and better services than Japanese, including, of course, better connections within the United States. "Beyond rights" look unequal on the surface, but in fact they were not. The American side argued that for Japanese carriers there was no demand for "beyond," but for American carriers there are strong demands for "beyond." The Japanese argued that if the United States excised unlimited "beyond" rights to Asian and Oceanic countries, Japanese should be allowed to have landing and takeoff rights everywhere in the United States, while pointing out the difference in geographical size. This is an interesting but lame logic and reveals both the intention and real anxiety of Japanese negotiators.

At any rate, a new temporary agreement (effective to the year 2002) was concluded in March '98, in which some "inequalities" are amended as follows.

i) The number of incumbent carriers:

Japan 3 (ANA and NCA)

U.S. 3

ii) Landing and takeoff points

in Japan	Japan	Unlimited
	U.S.	Unlimited
in the U.S.	Japan	Unlimited
	U.S.	Unlimited

iii) 'beyond' rights allowed for incumbents

Japan	unlimited
U.S.	unlimited

iv) Charter flights

Japan	400 a year	Year 2000~ 600 a year
U.S.	400 a year	Year 2000~ 600 a year

Japan acquired nominal equality after long negotiations, but that equality will not change the nature of the market. I presume that the U.S. did not lose anything by this agreement. Currently, the Asian air market is much less attractive as compared with one year ago when Asia was the growth center of the world. 'Beyond' rights are also less lucrative. Giving away nominal inequality to achieve a freer market where American carriers have cost advantages was a good policy to take for Americans.

After the new agreement, American carriers are increasing the number of trans-Pacific flights more rapidly than Japanese carriers, using the so far

unused slots vacated by FedEx and also the slots opened by the increase in number of landing-takeoffs per hour at Narita Airport.

III Why are Japanese afraid of open sky?

There are several reasons why the Japanese are afraid of "open sky."

The first reason is, of course, the lack of competitiveness of Japanese international carriers. According to the studies made by Professor Oum, the cost per passenger kilometer of JAL and ANA is considerably higher than the cost of major US carriers. If Japan liberalizes international aviation completely, the JMOT is afraid that Japanese airlines would have a great deal of difficulty, and many thousands of jobs directly and indirectly connected to aviation would be affected.

Scholars can argue somewhat irresponsibly that, even if JAL and ANA fail, Japanese consumers would be better off because they could travel at cheaper prices. For the JMOT, that sort of argument is, and will be, an absolutely unthinkable alternative.

Then, why is the cost of Japanese carriers high? Many economists emphasize unnecessary government interventions, saying if we abolish them all, we would achieve a similar level of efficiency as American carriers in time. Some analysts point out individual causes, such as high wages of flight attendants, low handle hours for pilots and other feather bedding. The JMOT is also pressing hard on airlines to increase productivity. But the loss of competitiveness of Japanese airlines is mostly results of the high yen price.

Back in '85, 240 yen equaled a dollar; now 130-140 yen equals a dollar. Eight million yen yearly pay for a flight attendant was \$35,000 in 1985, but it is now \$60,000(converted at the rate of 133.50 yen to a dollar). The purchasing power parity between dollar and yen now stands at 180 yen to a dollar. It took ten years to adjust to the lowering of yen from 240 to 180, and it may take another 6-7 years to adjust to 130-140yen to one dollar. It is not easy to move prices and wages downwards, yet many Japanese industries such as automobile manufacturing, shipbuilding, etc. maintained competitiveness. Those industries which regained competitiveness have been industries operating in fiercely competitive domestic markets. Since the yen is falling now, exports by these industries are increasing. Airlines should have done better.

Then, there is an absolute shortage of airport capacity and very high airport charges. As is well known, only a total of two runways in two airports, Narita and Kansai, handles 80% of the international passengers and freight.

Many local airports can not accommodate large planes and shut down at night. As a result, Japanese airlines can not use planes in an efficient manner. For example, the average flying hours of a 747 used by Japanese airlines are 2,400 hours, while averaging 4,000 hours in other major world airlines. Besides, airport charges in Japan are high. Landing fees of Narita and Kansai for international flights of 747-400 are almost 1,000,000yen, Haneda is 870,000yen, other Japanese airports are 725,600yen as compared with Los Angeles 148,430 yen and New York JFK 379,554 yen (133.50yen=1\$).

Similarly, for domestic flights of the 767-300, charges are 364,800yen in Narita, 288,800 yen in Kansai, 276,000 yen in other airports, while Los Angeles is 78,753 yen and JFK 139,589 yen. Since Japanese airlines have to use Japanese airports more often than foreign airlines, the share of airport charges in the total operating cost is high: 20.6% for domestic operations, 5.1% for international operations. Among three airlines, JAL which has more international flights, has the lowest share of airport charges (7.6%), ANA has the second (11.3%) and JAS has the highest (13.0%). Nevertheless, all three's shares are much higher than representative American airlines.

The JMOT hopes by the time Narita's second and third runways, Kansai's second runway, Chubu's first runway will be open for international flights, the competitiveness of Japanese airlines will be realized.

The second reason for Japanese anxiety concerning "open sky" in the trans-Pacific market is due to the difference in the size of domestic markets. Airlines both American and Japanese, that fly over the Pacific, also operate in the domestic markets. The U.S. domestic market is roughly ten times larger than the Japanese market, and American carriers are five times bigger than Japanese carriers. Both have the cabotage right. Therefore, it is like 'fair competition' between heavy weight and featherweight classes. Of course, this is a false argument of ulterior purpose. I heard similar arguments when Japan liberalized automobile imports.

The JMOT also argued that there is no way to prevent monopoly and oligopoly in trans-Pacific routes once we agreed on open sky. Some measures for precautionary control of the market for the sake of consumers are needed before adopting open sky.

The JMOT may simply be worrying about the monopoly or oligopoly by American carriers, but the argument itself challenges the concept of the complete laissez-faire as the best system. Don't we need some sort of anti-monopoly laws in a world with a globalized economy and the rise of world corporations?

The third reason for the JMOT rejecting open sky is its political

consequences and its impact on the bureaucracy. For some reason, many foreigners assume that the Japanese Government is a powerful policy maker and enforcer. Not at all. The Japanese Government is relatively small in size, and most officials were born after WWII and believe in democracy. They are careful in weighing public opinion and balancing a variety of interests. That is what politicians do in other countries. The Japanese Government tends to pursue a policy of making the least number of people unhappy. Time, patience and money have been its means of implementing policies.

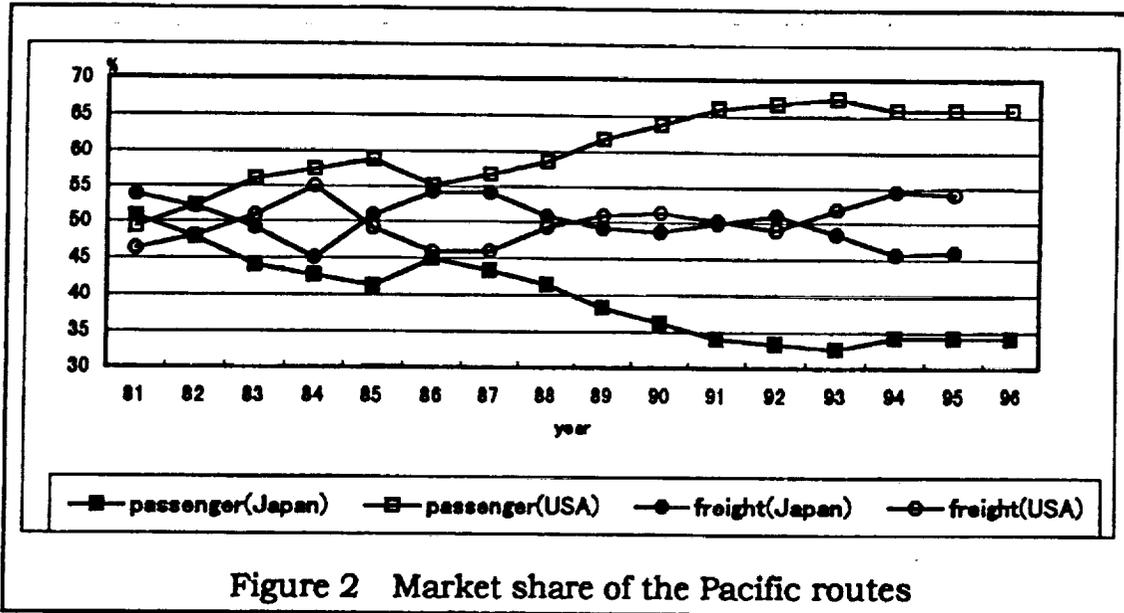
But now the government has neither time nor money. Yet the JMOT is still playing the role of a mediator among various interests, foreign pressure being a newcomer to the interests, and not of the enforcer.

The JMOT has not yet found the way to make the least number of people unhappy. When it finds that "open sky" is the way to achieve the goal, it will accept it.

Table 1 The numbers of flights in a week between two points (as of July 1, '97)

Route	Japan Co.	Flights	U.S. Co.	Flights
Tokyo-Los Angeles	2(JL13,NH7)	20	3(NW7, UA7, DL6)	20
New York	2(JL 8, NH7)	15	2(NW7, UA11)	18
San Francisco	1(JL7)	7	2(NW7, UA21)	28
Chicago	1(JL7)	7	2(NW7, UA6)	13
Seattle	---	---	2(NW7, AA7)	14
Detroit	---	---	1(NW7)	7
Washington, DC	1(NH4)	4	1(NW7)	7
Minneapolis	---	---	1(NW14)	14
Dallas	---	---	1(AA7)	7
Portland	---	---	1(DL7)	7
San Jose	---	---	1(AA6)	6
Atlanta	1(JL3)	3	---	---
Honolulu	1(JL36)	36	3(NW13,UA15,CS7)	35
Guam/Saipan	1(JL14)	14	2(NW14, CS17)	31
Sub-total	2(JL88, NH18)	106	5(NW90,UA60, AA20, DL13, CS24)	207
Osaka-Los Angeles	1(JL7)	7	2(NW7, UA7)	14
San Francisco	---	---	1(UA7)	7
Seattle	---	---	1(NW7)	7
Detroit	---	---	1(NW7)	7
Minneapolis	---	---	1(NW7)	7
Honolulu	1(JL14)	14	2(NW14, UA14)	28
Guam/Saipan	2(JL12, NH7)	19	2(UA7, CS14)	21
Sub-total	2(JL33, NH7)	40	3(NW42, UA35, CS14)	91
Nagoya-Portland	---	---	1(DL7)	7
Honolulu	2(JL7, NH7)	14	1(NW7)	7
Guam/Saipan	---	---	2(NW7, CS14)	21
Fukuoka-Honolulu	1(JL7)	7	1(NW7)	7
Guam/Saipan	---	---	1(CS11)	11
Sapporo-Honolulu	1(JL7)	7	---	---
Guam/Saipan	---	---	1(CS4)	4

Sendai-Honolulu	1(JL5)	5	---	---
Guam/Saipan	---	---	1(CS9)	9
Hiroshima-Guam	1(NH4)	4	---	---
Total	2(JL147, NH36)	183	5(NW153, UA95, AA20, DL20, CS76)	364



IV Towards a more opened sky

I do not think that Japan will change its stance quickly and spontaneously. For domestic markets, the JMOT will continue to take steps toward deregulation slowly but steadily. A few new entrants will establish themselves in the market. Competition will spread more and fares will come down if they are averaged.

Airport capacity limitations will continue. At Narita, the number of farmers who own land within the airport is down to two. Narita may be able to provide a parallel runway in a few years, but the opening of Chubu will not be until 2005, and Kansai's parallel runway around 2008. There are other airports that can accommodate international flights, but what airlines would like to fly into airports of less known smaller cities?

For the crowded airport, the JMOT will not adopt the price policy nor competitive bidding suggested by many economists, because most airlines would oppose them.

Instead the JMOT will try to reduce airport charges by expanding landside revenue and/or by acquiring subsidies from the Finance Ministry.

What will happen in the international arena depends on the course of

events.

- i) Will aviation continue to be separated from trade and other economic negotiations or in future negotiations will aviation be treated as a trade issue? There is no economic reason why aviation should be treated separately. The U.S. may propose to combine them in future negotiations at the time when Japan has a huge trade surplus with the U.S. Japan may have to yield in the field of aviation to avoid the rise of protectionism in the U.S.
- ii) What will happen to Asian economies? Will they recover quickly or slowly? How fast will "beyond" rights become 'attractive' again by the recovery of air demand?
- iii) What will be the price of yen vis-à-vis U.S. dollars? The price will have impact on passenger flows and also on the competitive edge of airlines.
- iv) How far will liberalization of international aviation continue in Asia and Pacific? If its impact on Japanese airlines is strongly felt (for example, already some 10 percent of the Japanese passengers who go to Seoul have destinations other than Korea), the JMOT will be forced to follow the crowd.
- v) Currently a number of large airports are under construction in Asia. Once these airports are completed, there will be excess capacity if only temporarily. Many countries may offer incentive packages to foreign airlines in an effort to become their international hubs. Unless Japan adopt 'open sky,' hubs will move to other airports in other countries from Narita.
- vi) How fast will global alliance, and code-sharing develop? Global alliance and code-sharing are ways to gain access to new markets that a single airline can not afford to enter or that are blocked by government regulations or capacity limitations. Global alliance and code-sharing could be the way to defeat the government regulations.

Together with these development, if "foreign pressure" in aviation continues, Japan may accept more 'open sky' in the 2002 negotiations with the United States.

53-03

**Toward a Market-Oriented Air Transport System?:
Recent Developments in Russian Civil Aviation Performance and Policy**

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After seven years of declining demand and deteriorating performance, the Russian civil aviation sector began what might be an incipient recovery in 1997. This paper describes the performance and emerging industry structure, and main policy issues as of early 1998. Due to the lack of consistent data and the difficulty in securing public release of the information that is available, this paper should not be viewed as a traditional academic analysis, but rather more of a clinical study.

Background

Russia is so vast that air transport, though much reduced since the 1980s, will continue to play a major role in the economy. More than two-thirds of intercity passenger travel and a material part of cargo transport is done by air. In a number of Russian regions, especially in Siberia and the Kola Peninsula, air transport is the only mode providing access to the other parts of the country.

The importance of civil aviation is reflected in the size of the sector. There were about 275,000 persons employed in the sector in 1997. The old integrated Aeroflot system has fragmented into about 340 airlines, with a total fleet of about 8,000 aircraft (of which 2,700 are core passenger and cargo planes), serving 845 airports. There are 14 training institutions and 4 research agencies dedicated to aviation, not including governmental organizations. Civil aviation is big business: users spend \$4-\$4.5 billion per year on domestic and international air tickets (about 0.8-0.9 percent of GDP).

Prior to 1991, the Russian civil aviation system was a massive vertically-integrated monopoly.¹ Aeroflot was responsible for everything – air services, airports, air navigation, training, accident investigation, and virtually all related services. When the Soviet Union collapsed, the old Aeroflot ministry-cum-holding company (for all air carrier operations, airports and air navigation systems) shattered into hundreds of fledgling separate companies, amidst confusion over the role of the federal government.

The effects of transition have been devastating. Passenger traffic in 1996 was 43 percent of 1991 levels, and only about one-third of the peak 1989 volume. Domestic passenger traffic was about 20% of the maximum levels reached during the 1980s and was still declining through 1996. Ton-mileage in 1996 was just under half of the 1991 level. By 1997, international air passenger traffic and cargo traffic had begun to show growth in line with the economy, while preliminary domestic traffic data indicated that 1997 may have been the first year this decade in which volume has not fallen.

Two significant international passenger flows have sprung up since 1992. One is “shopping tourism”: small merchants flying to Turkey and the Gulf states to stock up on foodstuffs, liquor, clothing and the like for street kiosks, bringing back large quantities of accompanied luggage. The other is wealthy “new Russians”

¹ For a description of Aeroflot’s structure and performance during the Soviet era, see chapter 7 in J. Strong and J. Meyer (with C. Harral and G. Smith). *Moving to Market: Restructuring Transport in the Former Soviet Union*, (Cambridge, MA, USA: Harvard University Press, 1996), pp. 135-156.

taking vacations in the Mediterranean. Both rely on charters to circumvent the regional airlines' lack of rights to operate scheduled services under Russia's bilateral agreements. So-called "regular charters" have emerged to serve these market segments. The small trader business is likely to ease off as conventional import/export business matures, but the outbound tourism is likely to keep growing rapidly.

These traffic declines have had severe consequences for financial performance and investment. The estimated sector loss in 1996 was 1.7 trillion rubles (about 350 million US dollars, or about 7 percent of revenues). Most airports were reported as profitable; the losses were incurred in airline operations. However, the airports rely for revenue on user fees paid by airlines, since the "concessions" which generate more than half of airport revenues in the West (car parking, duty free shops, restaurants, etc.) are still rudimentary in Russia.

It is clear that financial disparities are growing: between large and small airlines, between domestic hub and non-hub airports, and between international and domestic activities. However, it is very hard to know where the profits are being made and how much these estimates would be revised if full and proper accounting were made of liabilities. For example, while it appears that airports are making money overall, debts from these enterprises to federal and local budgets (many of which are in long-term arrears) continued to grow. At the same time, many of the remote airports provide services for which they have not been paid by the local governments. An example is the Murmansk Airport, that provides heat and hot water for the adjacent community, a suburb on the outskirts of the main city.

Investment in all sub-sectors has been virtually non-existent except for a few foreign or multilateral financed infrastructure projects to renovation older airport and air navigation facilities and to repair or replace broken or deteriorated safety-related systems.² The government estimates that 70-75 percent of sector assets are depreciated. Only about 60-65 percent of the required airport and air navigation systems were in service at any given time in 1997. In 1996, all Russian airlines together purchases 5 aircraft and 8 helicopters.³ Leasing has played a larger role, but this has taken the form of short-term time charters, rather than as a long-term substitute for outright ownership.⁴ The fleet remains economically inefficient and environmentally restricted in international services, due both to noise and emissions problems.

Safety levels continued to be poor. In 1996, fourteen aircraft accidents were officially recorded, claiming 230 lives. News agencies reported 50 crashes, most of them non-fatal but causing major hull damage. There were 725 additional equipment failures (engines and airframes) that did not result in fatalities, and growing numbers of flight crew-related accidents began to appear. Because operational data is unreliable, estimation of accident rates is difficult, but it appears that rates are at least 3-5 times worse than those in Europe and the United States. In many ways, the safety performance is remarkable, given the lack of investment and oversight of a sector undergoing extreme fragmentation.

² Low-cost refurbishment of airport terminals, such as has already been carried out successfully at Kiev Airport, may be affordable if the airports are willing to charge users a facility fee (departure tax) of a few dollars per passenger. Several cases to date (mostly in other former Soviet republics) have cost in the range \$15-25 million. Airports handling international traffic can do this more readily. In contrast, greenfield airport projects (typically starting from \$200-250 million) are unjustified and unaffordable today and for the foreseeable future. Most runways are adequate for today's reduced traffic volumes. Better approach radar and runway lighting to upgrade to Category 2 may be warranted in some cases for safety and economy (\$10-15 million). There may be a few cases of impending pavement failure which pose a safety hazard, but with complete resurfacing typically costing \$60-70 million, few if any regional airports will serve enough traffic in the short-to-medium term to afford more than patching.

³ Various parties within Russia continue to express concern about the imminent collapse of the aircraft manufacturing industry. In 1996 only five new aircraft were delivered from Russian suppliers, who before 1990 routinely supplied several hundred planes per year. Two new models are being offered, the TU204 and the Ilyushin 96, including with Western engines, but market prospects are very unpromising.

⁴ Leasing payments in 1996 were about 140 million US dollars, equivalent to average annual equivalent of 7-14 aircraft.

However, the apparent bottoming-out of traffic declines and a potential incipient recovery is likely to place growing stresses on safety. In the past six years, maintenance and repairs have relied heavily on cannibalization of underutilized aircraft and equipment to provide spare parts, so that many assets are no longer viable for service. Moreover, activity levels have been low enough so that strains on systems such as air navigation have been held within manageable levels, except at a few airports and en route centers at peak periods. Sectoral growth has the potential to cause a further deterioration in system safety.

Aviation Industry Structure and Performance

Reality has taken root to a major extent - the oblast-level integrated aviation operations have begun to realize that most of them will not become international gateways. There is increasing recognition of the role of regional hubs. There are noteworthy exceptions, though - such as the failed attempt by ARIA to take over the regional carrier in Nizhny Novgorod in summer 1997, due (in part) to the ambitions of the regional government.

Restructuring of the aviation enterprises is proceeding. (A summary of one of the major unified enterprises, the Russian Aviation Consortium, is presented in the Appendix to this paper.) There are now about 360 carriers in the sector and 845 airports, independent from one another in varying degrees. Of the airlines, 96 are licensed to operate scheduled flights, 127 operate charters and air taxi services, and 129 serve specific clients. Among the first category, 40 airlines carry 85% of all traffic. The remainder are a source of concern as to their impermanence and questionable safety standards.

Aeroflot Russian International Airlines (ARIA) has a market share of about 40 percent. (revenues about 1.5 billion USD). The number two airline is Vnukovo Airlines, which carried about 2 million passengers in 1997 with revenues of about 300 million USD. Transaero, a new airline, has had notable success and is planning to add more Boeing equipment to its fleet. But competition between ARIA and Transaero has been all but eliminated, in the wake of an agreement between the two carriers. Each now has a cross-ownership stake, and schedules, frequencies, and fares have been worked out that minimize competition between the two. It also is important to keep relative size in mind - Transaero has only 14 aircraft.

Entry of new carriers on trunk routes has caused sporadic fare wars. For example, the entry of 2 new carriers on the Moscow-Novosibirsk route created a fare war between 4 airlines in which prices in February 1997 fell from 880,000 roubles to 450,000 roubles. The discounting abated by spring, but three carriers remain, with fares about 700,000 roubles.

Civil aviation market is distorted by so-called "one-day airlines" that operate charters on lucrative routes. There are many complaints that such airlines are able to operate without paying air navigation charges to Rosaeronavigatsia or to airports, as a result of corruption. Many bribes appear to be generated by smuggling activity on such charter flights. Additional competitive pressures result from the permission of military planes to conduct commercial charter flights.

Financial relations between airports and airlines are confused and far from transparent. Of the 63 federal airports (which serve 80% of all traffic) 40 still belong to integrated airline-airport enterprises. Many of these "unified enterprises" receive implicit or explicit support from the regional government. For example, Krasnoyarsk local administration assumed responsibility for the debts of the unified airline/airport, so that the enterprise had sufficient financial capacity to lease DC-10 aircraft. Even those companies which have been "privatized" have, in most cases, become joint stock companies in which the federal, regional and local governments retain minority shareholdings. Even where legal separation has occurred, holding companies and cross-shareholdings abound which diminish the effective separation.

Many airlines are illiquid and the airports are able to collect only about 60% of billings. The airlines have sought --and been given-- financial relief by their home city or region, chiefly in kind or by deferral of taxes and charges. In consequence, discriminatory behavior toward the "home" airline is commonplace. As a

result, air navigation and airport fees are a very significant cost item for those airlines who do pay (averaging 18-20% of costs). For many airlines, air navigation charges are 70% of labor costs. For comparison, airport and air navigation charges appear to be 3-4 times higher than in western Europe.

The Moscow-based Aeroflot - Russian International Airlines (ARIA) has legally separated from Sheremetyevo Airport, while the St. Petersburg Aeroflot is in the transition process to legal separation from Pulkovo Airport. Others are following suit at differing speeds. Other new entrants are eager to "upgrade" from operating "regular charter" flights to scheduled operations, but the legal issues surrounding ownership and reassignment of operating rights, airport landing slots and terminal gates are still confused.

Almost all international bilateral rights went to ARIA as "heir" to the Soviet Aeroflot, when Moscow was virtually the sole international gateway, but there are now many claimants and applicants. Policy toward international air agreements is being developed on a bilateral basis. The major airlines, especially ARIA, have played a key role in determining this policy. For example, the 1997 agreement with Germany allows Lufthansa and ARIA each 10 gateways in the other's country.

Institutions managing and regulating the sector

After a period of confusion, the structure of government organizations is making significant progress. The 1997 Civil Aviation Policy appears to have clarified and defined responsibilities for certification of airlines, flight safety responsibility, air navigation, accident investigation, and interstate aviation. Organizational structure is very similar to that of US FAA.

The Federal Aviation Service (FAS) has all key regulatory powers, including over infrastructure. It is independent of the Ministry of Transport (MoT), reporting to a deputy prime minister. It has its own revenues. Air traffic control (other than at airports) is managed by Rosaeronavigatsia, a department of FAS. MoT has its Department of Air Transport, which responsibility for policy making. The Inter-State Aviation Commission manages aviation agreements among the CIS republics and investigates accidents; it is also independent of MoT.⁵

The first major policy initiative was the certification of airlines. Compulsory airline certification and licensing was introduced at the end of 1992. Formal procedures were adopted by Presidential Decree in December 1993, but it was not until the 1997 air code was adopted that full certification efforts were undertaken. By early 1998, 543 airlines had certified, of which 320 are licensed for passenger air service. The operating certificate is good for two years. Of the 543 licenses, 184 licenses have been revoked for financial problems or flight safety violations. In 1997, 65 licenses were revoked. Revocation is for six months minimum, with subsequent review. Major efforts now being undertaken to harmonize certification/licensing with European standards (currently, a Russian airline certificate/license is not reciprocally accepted in Europe).

Government's reform objectives

In 1997 the Federal Government proposed a reform program to address all the above issues. It is driven by a desire to arrest the decline of Russian air transport and aircraft manufacturing, enhance safety, and define an appropriate role for the Federal Government in the subsector. This covers questions such as what powers it should retain to regulate for safety and market failure, what rights and obligations should be left to the market or to regional and municipal governments, and the criteria which should guide the limited use of sovereign borrowing and guarantees for airports and air navigation systems (ANS).

The draft reform program is set out in a document entitled: "Basic Provisions of the RF Air Transport Adjustment and Reform Concept", issued by the Ministry of Economy and Federal Aviation Service, Moscow, 1997. The program is large and comprehensive, covering:

⁵ Most western countries (e.g. USA, UK, France and Germany) have independent accident investigation units

- (a) reform objectives and tasks: safety and economic regulation for airports, airlines and air traffic control, financial sustainability, and improvement and modernization of services;
- (b) airlines: pro-active government involvement in unbundling of airlines, airports, fuel supply and aircraft servicing; their commercialization, privatization, safety regulation, classification into levels (federal, regional and local), and consolidation into a smaller number, with foreshadowed government interventions to "achieve intended efficiency", including "protection of local airlines" and subsidization of aircraft.
- (c) airports: separation, establishment as joint-stock companies with minority⁶ public ownership, safety and economic regulation, including guarantees to support upgrading and transfer of "social facilities", together with the obligation to re-invest profits in the airport;
- (d) fuel supply: separation, privatization, and removal of entry barriers to achieve at least two independent operators at each large airport, preferably through competitive tendering;
- (e) airport-based aircraft maintenance facilities: separation and removal of entry barriers, facilitating the option of reintegration with an airline;
- (f) air navigation systems: higher safety through a wide range of upgrading to full compliance with ICAO standards, minimizing ANS charges to Russian air space users;
- (g) passenger reservation systems and the clearing house for inter-airline settlements, which serve as "market infrastructure"; and
- (h) aviation staff development: upgrading and expanding of aviation staff training, including pilots, maintenance, licensing and certification, and management.

A current major FAS initiative is to "restructure" the industry, through aggressive review of licensing of both carriers and route entry. Goal is to stabilize the industry and create an industry structure of 4-5 major carriers and 15-20 regional carriers by the end of 1998. Effective late 1997, special conditions on route licensing were adopted, regulating seat capacity on major trunk routes. Quotas are to be assigned based on length of time flying the route, social responsibilities, and financial health of the company. This regulatory initiative is beginning to be applied on trunk routes to/from Moscow, most recently in the routes to/from Ekaterinburg.

Public Policy Issues Contained in the Reform Initiative

Government's role as regulator and guarantor

The Reform Concept document advances a wide range of major reforms, many of which are in keeping with the establishment over time of a competitive and financially independent sector in most areas. However, it also advocates several policy initiatives that are inconsistent with this objective. It appears to advocate strong government intervention to bring about a substantial reduction in the number of air carriers, rather than allow market, commercial and financial forces to shape the industry. This warrants close attention. So do the issues of (i) separation of carriers from airports, so far less than complete in many cases, (ii) user charges for airports, (iii) the justification for, and financial sustainability of, the extensive improvement proposed in ANS, and (iv) protection and State aids for domestic aircraft manufacturing and sales.

There is also a need to redefine the role of the Federal Aviation System and the government. Rather than detailed route licensing and tariff review, the Government's role should focus on:

- (a) ensuring a level playing field among competing private carriers, through non-discriminatory user charges, access to operating rights, airport runway slots and terminal gates, and access to reservation systems;

⁶ The Reform Concept paper specifies "up to 38% State ownership".

- (b) setting standards for safety, licensing carriers and crews, aircraft and airports;
- (c) investigating accidents and safety violations;
- (d) negotiating international operating rights (with attention to the issue of designating carriers other than ARIA to operate routes from gateways other than Moscow);
- (e) subsidizing essential services (public service obligations) to remote locations (especially northern regions); and
- (f) providing direct finance from Federal Budget or guaranteeing loans for infrastructure of national importance: Class 1 airports and ANS. Conditions should be attached to this financial support to give beneficiaries incentives to comply with Government policy.

A main policy objective of Government financial support to airports or ANS entities --and by extension any multilateral financing-- should be to tie it to adoption by the federal government of "rules of the game" for airport ownership, planning and development (including commercial opportunities), and criteria for possible federal support to airports. These rules of the game would require, among other points, that all monies raised from airports at the local and regional level could be used only for airport development, so as to avoid burdening the sector with cross-subsidization of other activities. Federal financial support would (a) only go to rehabilitation and safety needs; (b) have to be repaid by the receiving airport authority over time; it would be conditional on (c) implementation of reforms such as dismantling of the vertical integration of airports and airlines, privatization and demonopolization of airport service concessions and parking, and (d) establishment of an effective safety and economic regulatory regime.

The stress placed by the Reform Concept paper on measures to protect domestic suppliers of aircraft and other aviation equipment risks coming into conflict with international trading rules under the WTO and IFI procurement rules on competitive bidding. Other solutions to the manufacturers' crisis should be explored, in the areas of marketing, finance and organizational restructuring. The sooner equipment decisions can be internalized as the responsibility of private owners, the quicker the domestic industry can stabilize its size and finances.

Air Navigation

Reorganization of FAS brought Rosaeronavigatsia into the organization: the State ATM Corporation remains separate for investment and financing purposes, but is under control of FAS. Air navigation charges remain arbitrary, in part because of discrimination and in part because of an inability to collect charges. Rosaeronavigatsia appears to collect only about 60% of billings. International airlines complain that they are being grossly overcharged on overflight royalties for the trans-Siberian (Moscow-Tokyo) route, on the order of \$250 million per year. Rates average US\$1.00 per km, compared to US \$0.40 per km in western Europe. The State ATM Corporation says it needs to charge about USD 1.50 per km for overflight fees. In defense, it is claimed that costs are high and charges are further raised to compensate for the non-payment by many users. The European carriers are pressing for either lower charges or the establishment of a mechanism to ensure that the revenues are plowed back into system improvements.

The State ATM Corp. is just beginning to shape an investment program. A 1998 investment program of 864 billion roubles is planned - 376 billion roubles from internal sources, the remainder from borrowing. Rosaeronavigatsia estimates that they will need about 800 billion roubles annually for the next 4-5 years to complete the main ATM modernization. Key investment priorities were given as the Moscow ATC Center (estimated cost 180 million USD); North Caucasus air routes (10 years, 120 million USD); Khabarovsk air routes (30 million USD); Far East air routes (Irkutia); Trans-Volga air routes; and 10 additional modernization projects that have not yet been prioritized.

⁷ Moscow Center program has been approved. In July bidding will be held for first stage 10 million USD

With respect to new technologies, Rosacronavigatsia have received many proposals, but none appear to be "in the lead" and none appear to utilize Russian technology and systems to the extent desired by FAS. The State ATM Corp. appears committed to GLONASS. About 60% of federal airports and about 4,000 aircraft are equipped with GLONASS equipment. They contend that since control of GLONASS has been transferred to the Russian space agency from the military, it should be incorporated into the world's satellite navigation plans. The main GLONASS problem is maintaining space segment of program. Need 24 satellites for full global coverage, but Russia currently only has 13 functioning satellites (the other 11 have exhausted their lifetime operations).

Moscow Airport Policy

The Moscow Airports problem was described as "a separate country within this country... although the State has a controlling stake, it means very little in practice."

No status of a single Moscow airport has been determined. There are disputes concerning terminals versus airside facilities, and about overall title and control of the land at each site.

The ownership/title problem is a significant hindrance to investment. The principal disputes involve the Property Committees of the RF, Moscow oblast, and Moscow city. These issues also are muddled by cost and revenue allocations from the city, oblast, and federal governments. A summary of problems at each facility follows.

1. Sheremetyevo II (SVO-2)

- a. A federal airport, but claims also made on property by Moscow oblast.
- b. Tensions between SVO-2 and Aeroflot appear to have eased, after getting very contentious. The main reason seems to be an accommodation that facilitates coordination between the airline and the airport. (These might be viewed as either discriminatory, or similar to an informal "majority-in-interest" provision that major airlines frequently have with their hub airports in the United States.)
- c. Flight delays are limited, and not seen as a problem. Investment orientation is more toward comfort and quality.
- d. Severe land constraints face SVO-2, especially in expanding airside servicing capacity and in landside access and parking.

2. Sheremetyevo I

- a. Increasing amount of business aviation activity, with scheduled service fairly limited (to north and Baltic countries).
- b. Administratively completely separate from SVO-2. SVO-1 has its own runway, tarmacs, etc.
- c. Terminal facilities and landside access (especially parking) already quite busy, and will not be able to handle any sizable increase in activity.

3. Vnukovo Airport

- a. To many Russians, Vnukovo "makes sense" as Moscow's #2 airport and its principal domestic facility.
- b. Better access to city than Domodedovo.
- c. Airline/airport separation was completed in privatization process.
- d. State-owned airport, with status in limbo. Throughout 1997, it was expected that the State would sell its shares, but no action. Originally, it was thought that the sale would be made to a collective of airport workers, but the new law on privatization does not allow the Government to sell to workers at "bargain" prices, while the workers are not interested in buying the airport at a Government-determined "market" price.
- e. As a result of the ownership dispute, almost all investment has been halted.
- f. Vnukovo Airlines is the dominant carrier (about 50-60% of operations). While airline is separate from airport, there appears to be a "working relationship" that has a different character

than the relationship of other airlines with the airport. Both airline and airport officials view this as a "counter-balance" to other markets where airline/airport separation has yet to occur, and to the relationship between ARIA and Sheremetyevo.

- g. The Moscow city authorities (especially Mayor Luzhkov) have been increasingly focused on Vnukovo airport.
 - h. Facilities at terminal appear adequate in terms of physical capacity, if not quality.
 - i. There is a very large unfinished maintenance hangar that was halted when federal budget money ran out in 1991; there is much maintenance and repair activity going on outside in cold winter weather.
 - h. Expansion plans are limited by condemnation difficulties (there are many prestigious dachas in the surrounding area).
4. Domodedovo Airport
- a. Still a unified airline/airport enterprise. Corporatization efforts still in process of discussion/clearance.
 - b. Over the past three years, the airline has basically collapsed and is now in the process of selling its aircraft (especially IL-62s and IL-96s). Losses from the airline brought all investment and upgrading activities at the airport to a standstill.
 - c. Much uncertainty over what will happen:
 - 1. Potential home base for smaller regional airlines being "pushed out" of Sheremetyevo and Vnukovo airports. (example: Ural Airlines serving Ekaterinburg)
 - d. Potential cargo development opportunity, especially as plans for a major cargo terminal at SVO-2 have died.
 - 1. Nearby Zhukovsky Airfield, used by the aircraft design bureaus, generates a substantial volume of cargo.
 - 2. East Line air cargo company is now based at Domodedovo and appears to be commercially successful.
 - 3. Rail/intermodal access better than at other Moscow airports.

5. Bykovo Airport

- a. Unified airline/airport enterprise.
- b. Small, used principally by turboprop flights from Ukraine. Cannot handle aircraft larger than Tu-154.
- c. Very serious airport deterioration, especially on runway, taxiways, and airside. Possible safety risks.
- d. Adjacent to aircraft repair plant, that has aggressively asserted control over airfield.
- e. Major ongoing conflict between the factory and Bykovo Airport/Airline. Airport sought to expand repair business claimed by factory.
- f. Long-term future appears to be as a airport controlled by the repair company, with limited flights on a contract basis.

Other Airports

Several regional airports are now seeking to attract direct flights from Western Europe and see the need to upgrade their facilities to handle international traffic at quality standards recommended by ICAO. Among these are Yekaterinburg, Novosibirsk and Sochi, which have already prepared feasibility studies and business plans to more or less acceptable standards. Lufthansa is already operating eight flights a week direct to six internal cities, though the ground facilities are barely adequate. Other west European airlines have been evaluating the market.

Whether it makes sense economically and financially to operate direct flights to and from Western Europe depends in part on whether and when Moscow develops an airport capable of serving as an interchange hub. Domodedovo Airport has the best long-term physical potential as the Moscow hub but very substandard terminal facilities today; but Domodedovo Airlines is bankrupt and starving the (still integrated) airport of funds. Sheremetyevo vigorously defends its role as lead gateway. Vnukovo Airport is home to the country's second largest airline. This hot political issue seems deadlocked. Ideally the long-term strategy for the regional airports would follow from the long-term strategy for Moscow, but they may give up waiting.

Reservation and Ticketing Systems

Since transition, it has been difficult to implement ticketing and interline systems, as the entire civil aviation sector fragmented. No individual carrier or airport had enough incentive or financial capability to develop a system in which others could participate. As a result, it fell to the public sector. Until 1991, all work was financed from the budget, but then funding was halted. Not very much progress in the last 2-3 years on integration of systems.

Since that time, the major airlines of Russia set up several specialized companies to do their own projects for ticket reservations and settlement. In most cases, the developers ran into problems, couldn't keep to goals, and ran out of money. A particular problem was in getting the required technology to locations other than in the headquarters city.

As a result, the airlines changed plans. Aeroflot was not eager to participate in the domestic development of the GABRIEL system that it uses for international reservations.

The current goal appears to be integration of the Russian-designed systems with western systems.

The current system is one in which the Gabriel and Siren systems operate in parallel, often with very different market shares. For example, Aeroflot ticketing is about 75% Gabriel/15% Siren; Vnukovo Airlines' ticketing is about 80% Siren/15% Gabriel. The parallel systems do not "talk" to each other, so that on a typical 150 seat flight, a carrier might have to set aside 100 seats for Siren bookings, and 50 seats for Gabriel bookings. The result is often large numbers of unsold seats, because it is very hard to transfer blocks of seat availability from one system to another. However, as growth returns, incentives to solve this problem will be forthcoming.

Since 1995, standard ticket stock (a prerequisite for interlining, clearance, and settlement) has existed. However, only 5% of all tickets are on such stock. The other 95% are on airline-specific stock.

Approximately 200 ticket agencies are now accredited, through the TKP (ticket clearing house) to use multiple ticket stock. However, Aeroflot has announced plans to leave this system and to only clear other carrier tickets on a case-by-case basis.

Summing Up

The civil aviation sector in Russia may be at the early stages of a slow recovery. Recent public policy efforts, especially the 1997 Reform Strategy, contain many much-needed guidance and has really helped develop, define, and strengthen oversight institutions. The 1997 Report recommended a fundamental change of role for the government to allow the development of a private, competitive, financially self-sustaining aviation system. However, recent policy initiatives threaten to introduce economic controls and oversight that are quite extensive and almost certainly will reduce competition.

It is very important to legally separate carriers from airports. (A summary of the issues that exist in such situations is best understood by reviewing the Appendix to this paper, which shows how one unified enterprise has expanded into geographic reach into both airlines and airports.) The public sector needs the capacity to monitor the performance of the privatized enterprises and ensure a level playing field among competing carriers. International operating and overflight rights needed to be renegotiated in concert with the other CIS republics. Responsibility for financing airports needed to be devolved to regional and

municipal governments, with clear rules established for user charges (landing fees, passenger facility charges, etc.) and criteria set for any federal participation in financing airport improvements.

APPENDIX

The Russian Aviation Consortium

RAC is a fledgling aviation holding company trying to establish a strong Moscow position with Vnukovo Airlines, and a dominant position in the Russian north (Murmansk, Arkhangelsk, and charter business related to natural resources and fishing).

1. History: RAC established 1995 subsequent to Presidential Directive, to support and improve aircraft industry. Original founding organizations were Aeroflot, Tupolev, Ulyanovsk Design Bureau, Aviastar, Perm (engines), as well as smaller participations by some banks and design bureaus.
2. Not long after, Aeroflot and Tupolev dropped out; orientation changed from aircraft manufacturing to operations. There are no longer any manufacturers as owners, nor is there any airport ownership of RAC.
3. RAC is now an investment group that owns 75% of Vnukovo Airlines, 60% of Murmansk Airlines (80% voting shares), 32% of Murmansk Airport (and intends to buy a controlling stake when the State Property Commission sells its current majority holding), and controls the Federal Industrial Bank. RAC also owns Ore Avia Airlines, a charter operator operating YAK-40 and YAK-42D aircraft, with clients including Conoco, Shell, Exxon, and Philip Morris. The RAC also is negotiating to buy a controlling stake in Arkhangelsk airport.
4. Summary information on Vnukovo Airlines
 - a. Second largest Russian carrier.
 - b. 24 aircraft (half IL-86s; half Tu-154s)
 - c. 2 million passengers/year
 - d. 45 destinations
 - e. Primarily domestic (international only about 10-12% total operations)
 - f. Revenues about 270 million USD 1997 (preliminary); 212 million USD 1996
 - g. Profitable, but just barely (not able to confirm)
 - h. About 300 billion roubles debt; claim that asset value is greater than debt, but no figures because revaluation has not been completed by auditors.
 - i. Financial statements for 1997 will be ready March 20, 1998
5. Summary information on Murmansk Airlines
 - a. One of first airlines sold by federal government after bankruptcy proceedings.
 - b. Fleet of 4 Tu-154 aircraft (new planes - manufactured in 1993)
 - c. Airline inherited heavy burden from old regional directorate of Aeroflot, including helicopters, small planes, and landing strips on the Kola Peninsula. These activities and assets have serious negative effects on financial performance, but perform "arctic work": transport to icebreakers; forest fire control; crew changes on ships; medical assistance. Local government pays subsidy of 4 billion roubles per year for such services.
 - d. Acquired by RAC in April 1997; effective management control beginning October 1997
 - e. Revenues about 150 billion roubles 1997 (25-30 million USD); not profitable, but "within striking distance" of breaking even in trunk markets (about 75% of revenues)
 - f. About 200,000 passengers/year (stable past 3 years); compared with 1 million passengers/year in 1990.
 - g. Cargo operations only 5% revenues (1,500 tonnes in 1997 vs. 8,000 tonnes in 1990).
 - h. Serve 3-4 markets with scheduled service; charter flights are about 20% of total flights
 - i. Hope to acquire 5 additional aircraft of 30-50 passenger capacity to serve smaller regional markets.
6. Summary information on Murmansk Airport
 - a. Began operations 1936; current airport built 1976-1977.

- b. Single runway 2,500 m; ICAO Cat I
- c. 1996 separation of airline from airport; 1997 purchase of stakes in both by RAC
- d. Airport aviation-related revenues about 60 billion roubles; collect about 40% of billings for aviation charges.
- e. Airport also operates fuel complex and provides heat and electricity to nearby settlement.
- f. Runway reconstructed 1992-1993; needs repair now, but is subject to ownership dispute, since technically all runways belong to State Property Committee. FAS is working out a model trust agreement that would resolve long-term control aspects and transfer to airport balance sheets.
- g. Runway improvements need to focus on traction, strengthening, and (possibly) extending.
- h. Air traffic control operates satisfactorily, including glide slope, lighting, and communications.
- i. Good all-weather performance.
- j. Major needs for airport equipment upgrades (plows, tugs, etc.)

Title: The Asian Economic Crisis and Its Implications for Aviation Policy in Asia Pacific

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Abstract:

Up until the second half of 1997, there was widespread confidence that commercial air transport activity would grow more quickly in the Asia Pacific region than it would in other markets. The airlines based in the region embarked upon costly re-equipment and expansion plans while the major carriers in North America and Europe actively expanded their presence by extending their networks and alliances. The rapid growth put pressure on the governments in the region to relax their approach to competition and the result was the emergence of new Asian airlines with ambitious plans, open skies agreements with the United States, and agreements to form regional aviation markets in South East Asia. Within APEC there was a commitment to pursue a more competitive air services regime.

Even before the currency crises leading to IMF bail-out packages for Thailand, Indonesia and South Korea, the airlines were losing traffic because of a variety of special conditions such as the smog conditions associated with the forest fires in Indonesia. However, the abrupt decline in wealth, the spate of business failures, fears of job insecurity and austere economic programmes that occurred in late 1997 had catastrophic impacts on traffic levels for some markets. At the same time, the region's airlines were highly exposed to currency movements and their debt obligations escalated sharply along with interest rates. Many other airline costs are incurred in hard currencies and the airlines have moved rapidly to refinance their fleets, reorganise their routes and to take greater advantage of alliances. The adjustment process will continue for some time and it will involve far-reaching changes.

This paper examines the impacts of the economic crises on the airlines and the responses being pursued by management. Given the trend towards more liberal competition policies, an important question is whether the current circumstances are likely to lead to a return to more protectionist attitudes. The temptation to shield carriers from competition will have to be balanced against the need to open up markets, to forge alliances and to attract investment. We argue there are strong forces likely to support further liberalisation.

Key words: airlines, open skies, regional trade agreements, bilateral system, Asian economic crisis

The airlines have been left highly exposed with commitments to purchase aircraft in hard currency, the value of their debt has escalated rapidly, interest rates and fuel costs have increased, and traffic has fallen sharply. Profit projections for the region's carriers were written down immediately and the expectation is that some will record losses amounting to hundreds of millions of dollars (US). The newer carriers that relied on domestic and intra-Asian business have been the worst affected. Airline responses have included selling aircraft, partly to reduce capacity and partly to finance deliveries of new aircraft. Sale-and-leaseback deals have been common and aircraft orders are being deferred where possible. Airlines are striving to reallocate capacity to stronger routes connecting Asia with Europe and North America.

The currency devaluations will help to stimulate travel demand and there will be winners and losers as destinations compete for their share of a smaller market. Also, as some airlines pull out of routes the remaining carriers have opportunities to increase their revenue. Depending on the ability of the airlines to maintain their yields, Asia's carriers will keep their attention firmly on reducing their costs and on financing their fleets. However, the restructuring process will be painful even under the most optimistic scenarios. There is speculation that some airlines will merge and that major European and North American carriers will become part-owners of Asian carriers.

This paper examines the impacts of the economic crises on the airlines and the responses being pursued by management. Given the trend towards more liberal competition policies, an important question is whether the current circumstances are likely to lead to a return to more protectionist attitudes. The temptation to shield carriers from competition will have to be balanced against the need to open up markets, to forge alliances and to attract investment. Though we illustrate the impact of the economic crisis with examples of recent developments, our focus is on long-term impacts on cost competitiveness of Asian carriers and the regulatory environment in which they will operate.

Asia's Airlines and the Competitive Environment in the early 1990's

Asia's airlines can be categorised broadly in two groups for the purpose of discussing their historical development. The first set began to make their presence felt in international markets in the 1970's as wide-bodied aircraft were reducing the costs of long-haul travel. Traffic between Japan and North America had grown because of the USA's military presence during and after the conflict in Korea. At the same time, growth on the Kangaroo Route from Australasia to Europe was creating opportunities for aggressive airlines based in South East Asia (Rimmer, 1996). Singapore Airlines and Thai Airways, for example, were based advantageously at interchange points and were convenient and attractive stopover airports. Asia's emerging airlines of the 1970's possessed a significant competitive advantage through their low input prices (Findlay, 1985) and they were able to capture a growing share of the market.

As the Asian economies began to prosper during the 1980's, these carriers expanded and the network of intra-Asian airline services entered into a period of rapid development (Rimmer, 1996). In aggregate, traffic in Asia was averaging growth of more than 10% each year while some routes were sustaining growth rates of over 20% a year for several years in succession (Air Transport Action Group, 1997). For various reasons, the established Asian airlines were having difficulty coping with this growth and governments began to relax their regulations to permit new, private-sector airlines to emerge (Nuutinen, 1991; Bailey, 1993; Bowen & Leinbach, 1995). This accelerated the liberalisation of airline competition through multiple designation and the development of new intra-Asian routes as the new entrants pursued international ambitions (Bowen, 1997; Hooper, 1997).

In developed airline markets, the most common entry strategy for new airlines has been based to a large extent on cost leadership. The source of the cost advantage can come from high productivity levels, say, through high aircraft utilisation (eg. Southwest Airlines in the USA) or through low input prices (eg. paying employees less and by operating older aircraft). The first group of Asian airlines did enjoy a significant advantage in terms of input prices. For example, in 1976 Pakistan, Malaysia, Korea, Indonesia and Thailand all had input costs that were less than half those for the US carriers (Brunker et. al., 1989). Though the Asian carriers had low productivity levels, their unit costs remained competitive.

especially the case for the exchange of fifth freedom rights with the result that the Asian airline industry remains relatively fragmented.

The Impact of the Economic Crisis on Traffic Levels

Informal business networks, close relationships between financial institutions and their borrowers were mechanisms that facilitated rapid growth in Asia, but the financial sector became exposed to risky investments. A lack of control over lending practices and inadequate disclosure and reporting requirements have been pin-pointed as fundamental weaknesses of the Asian economies. Speculation in property, in particular, became a problem as the global economy began to slow down. In Thailand alone, 58 firms accumulated debts of US\$16 billion as a result of speculation. Alan Greenspan highlighted "politically driven lending" on conspicuous construction projects as a key contributor. When the weaknesses of the financial sector in Asia began to emerge, currencies began to enter a free-fall. Property prices and share values have been cut and Asia's wealth was written down almost overnight. The list of business failures includes merchant banks through to steel producers. The International Monetary Fund (IMF) has had to step in with rescue packages in Thailand, Indonesia and South Korea.

Views about the prospects of a quick recovery differ. Some economists point out that the fundamental strengths of Asia had been a plentiful supply of labour with increasingly high skill levels, the capability to leverage growth with proven technology, government policies that supported export activity and that provided necessary infrastructure. A less optimistic view is that there are major political and institutional barriers in Asia inhibiting further development and that it will take time to resolve these problems. The financial sector is high on the list of institutions requiring reform with less reliance on close relationships with corporate borrowers and on informal networks and greater emphasis on strong regulatory and supervisory structures (Walton, 1997).

Critics of the IMF argue that the rescue packages impose excessive austerity and that there needs to be more attention paid to stimulating domestic demand. All of the while, Japan's economy continues to languish. Japan is important for at least three reasons. The first is that an important ingredient in the success of the Asian economies has been the investment by Japanese institutions. The poor returns and the risks in Asia will see funds redirected to other areas. The second factor is a consequence of this – the leveraged lease in Japan has reduced the costs to airlines of financing aircraft purchases. This appears certain to disappear. The third factor is that the economic recession in Japan has fallen heavily on segments of the population that had generated some of the strongest growth in travel markets.

The Government of Japan has kept interest rates low and has adopted fiscal measures designed to boost the economy, but the failure of these measures is undermining business confidence within and outside Japan. That Japan's financial institutions still are exposed to risk because of the amounts of non-performing debts in their portfolios has been the signal for Moody's Investment Services to downgrade the nation's risk rating. Sony's chairman, Norio Ogha, said in early April that Japan was on the verge of collapse and this could be the trigger for a world recession.

Australia's Tourism Forecasting Council (TFC) has published several assessments that help in gauging the impact of the crisis on tourism flows. The TFC produced a set of long-term forecasts of international visitor arrivals for Australia in November 1996 (TFC, 1996). Along with most forecasting agencies, the TFC did not anticipate the economic crisis that was to occur in the very next year and it quickly issued a bulletin in December 1997 to revise its predictions. The new work took account of currency devaluations up to 31 October 1997.

For some economies, though, conditions continued to deteriorate. For example, the Indonesia Rupiah had devalued by 40% against the US dollar compared to its average value in 1996. But the economic crisis had not run its full course and, by the end of January in 1998, the Rupiah had fallen 246% from its 31 October value. The Korean Won had remained stable in 1997, but by December it had accepted an IMF bail-out

The economic crisis immediately placed Asia Pacific's airlines under severe financial stress. Air New Zealand, with 13% of its operations in Asia, reduced its profit projection from NZ\$200 million to NZ\$150 million after its revenue fell by 20% in December. Table 2 documents some of these impacts. Korean Airlines, for example, revealed in February 1998 that it had lost US\$900 million as a result of the devaluation of the Won. The IMF's guidelines make it difficult for governments to rescue their airlines within the strict budgetary conditions of the bail-out packages and there is pressure to allow foreign investment. Concerned employees of Korean Airlines used their bonuses in December 1997 to buy shares in order to protect their management. Thai Airways has announced record losses and Sempati Air, a new entrant in Indonesia, has gone into liquidation. Given this degree of financial stress, we examine the responses of the airlines.

Table 2: Sample of financial and managerial implications of Asian economic crisis

Date	Airline	Event
December 1997	Korean Airlines	Ends plans to offer shares. Employees use bonuses to buy stock to protect current management after the Government allows up to 50% foreign ownership
February 1998	Korean Airlines	US\$900 million dollar foreign exchange loss due to 40% devaluation of the Won
March 1998	Air New Zealand	Announces its profits for 97/98 fiscal year to fall from prior forecast of NZ\$200 million to NZ\$150 million
	All Nippon Airways	Predicts loss of US\$25.2 million for financial year ending 31 March 1998 compared to net profit of a similar amount in previous year. Announces a 3-year plan to restructure the airline and reduce costs. Salaries of pilots and managers reduced by 3% and staffing levels to be cut by 1,000 over the 3 years
	Bouraq Air	Suspends 300 staff on extended leave on 50% pay and announces plans to suspend another 900 employees
	Cathay Pacific Airways	Revealed profits for calendar year 1997 were US\$217 million, 56% lower than the previous year after load factors declined from 74% to 68%. Cathay announces intention to sell 7 B747-200 aircraft to reduce capacity and lays off 40 flight engineers
	Garuda Indonesia	Announces it is selling non-core businesses (hotels, travel agencies and spare parts) and is selling up to 25% of its fleet to reduce its capacity
	Japan Airlines	Writes off US\$1.2 billion of losses by reducing the value of shareholdings and loans to subsidiaries and by reducing shareholder equity
	Saeaga Airlines	Malaysian start-up suspended its operations after preparing to operate to several Asian and Australian airports
	Sempati Air	Staff levels reduced by 60% (1,400) and 2 of its 4 A300-B4's impounded in Malaysia after the airline failed to meet lease and maintenance payments
	Thai Airways	Cutting costs by 6 million baht after announcing an operating loss of US\$561 million for the December quarter of 1997 as a result of foreign exchange losses
	Japan Air System	To cease employing ground staff and plan to reduce staff by 500 over 3 years. Wage rates and managers salaries to be held constant while flight times for cockpit crews to be reduced
	Vietnam Airlines	Government rejects proposal to increase fares and calls for a strategy to improve performance
April 1998	Air New Zealand	Downgraded its profit projection for the current fiscal year by 25%
	All Nippon Airways	Pilots pursue industrial action in opposition to 15% cut in salaries and ANA cancels services to the USA, Hong Kong and Europe

his permission, Sempati Air immediately cancelled services on 10 domestic and 4 regional routes (including to Taiwan). The Minister intervened to stop Merpati Nusantara, one of the Government's airlines, taking similar actions on 80 of its routes. Instead, the Minister agreed it could phase out routes with load factors under 30%. Garuda Indonesia has cut its international flights by 30% and domestic flights by 26%.

Qantas Airways, Ansett International and Air New Zealand were among a number of airlines to suspend services to South Korea early in 1998 when the number of Korean residents travelling abroad fell sharply. Asiana Airlines ceased 15 flights on 6 international routes and Korean Airlines dropped 48 flights on 21 international routes.

However, airlines have been seeking opportunities to re-deploy their capacity. Singapore Airlines and Cathay Pacific Airways have both outlined plans to increase the frequency of flights to Australia. All Nippon Airways was quick to take advantage of its improved access to the USA market under the new air services agreement concluded between the USA and Japan early in 1998.

Table 3: Service level changes resulting from the Asian economic crisis

Airline	Decision
Air New Zealand	Reduces services between New Zealand and Indonesia, Thailand and Malaysia and cancels services between New Zealand and South Korea. In February it announces plan to reduce capacity on Asian routes and redeployment to Australia-New Zealand market. Adds more non-stop flights from Australia to USA
Air Philippines	Granted international rights in June 1997 but announces it is concentrating on domestic routes
Ansett International	Cancels services between Australia and South Korea and ceases daily flights from Sydney to Kuala Lumpur via Jakarta after the load factor and yields fell
Asiana Airlines	Ceases 15 flights on 6 international routes
Astro Airlines	Taiwanese new entrant to launch services to 3 cities in the Philippines
British Airways	Withdraws direct services to South Korea
Cathay Pacific Airways	Plans to increase frequency to Australia, Europe and North America
Garuda Indonesia	Ceasing services from Jakarta to Manila, Bangkok and Canton and from Medan to Kuala Lumpur and Singapore as international flights are cut by 30% and domestic flights by 26%
Harlequin Air	Affiliate of Japan Air System plans to commence DC-10 charters from Fukuoka to Australia and add Hawaii, Bali, Kathmandu and others from mid-February 1998
Korean Airlines	Dropped 48 flights on 21 international routes
Merpati Air	Terminated services on 63 of its 423 domestic routes in February after earlier being refused permission to cease operations on 80 routes.
Northwest Airlines	Increasing its Tokyo-Los Angeles flights from 7 per week to 10 to connect with onward services to other parts of Asia.
Orient Thai Airlines	Ceasing suspends all domestic flights until permitted to fly to major cities

Table 4: Fleet decisions in the wake of the Asian economic crisis

Date	Airline	Decision
December 1997	Garuda Indonesia	Fails to pay US\$8 million on A330 leases. Government provides sovereign guarantees so that airline can take delivery of 17 B737's
February 1998	Asiana Airlines	Sold 4 B767s plus one other aircraft in a leaseback deal and deferred plans to buy 5 new aircraft in 1998
	Korean Airlines	Already had sold 4 A300s and a B747-400 to its creditors under a nine-year leaseback arrangement. It also sold a B747-200 freighter and was arranging the sale of 3 more aircraft
March 1998	All Nippon Airways	Adding 10 aircraft in next financial year (to 31 March 1999) and selling 6 with 5.7% increase in ASK's. Its new aircraft will be its first 4 B777-300s, 2 B777-200s, 2 B747-400s and 2 A321s
	Asiana	Defers delivery of 2 B777. Cancels plans to order 5 more aircraft in 1998, sells some of existing fleet and leases them back. Selling 3 B767-300ER and 2 B747-400
March 1998	Cathay Pacific	Defers options on 16 Boeing and 9 Airbus aircraft and places 7 B747-200's up for sale to reduce capacity
	Garuda Indonesia	Attempting to sell 4 DC-10, 4 B747 and 5 A300B4 after failing to pay US\$8 million on A330 lease payments
	Korean Airlines	Sells some of its fleet and leases them back
	Malaysia Airlines	Sells a DC-10, an A300B4 and 6 737-500 to finance deliveries. Negotiating with Delta to take over commitments to buy 4 B777s
	Philippine Airlines	Delaying aircraft deliveries and cancelling 6 B747-400 orders and orders for 3 of its orders for 8 A320s delayed by one to two years. Said to be Asia's first default on an order
	Saega Airlines	Cancels orders for 5 A320 aircraft in suspending operations because of the state of the Malaysian economy
	Thai Airways	Delaying deliveries of 17 Airbus and Boeing aircraft and intends to sell 3 DC-10-30ERs and 5 BAe146-300s. But followed this within the month by ordering 5 A300-600Rs, 3 A330-300s and one B777-300 and one B747-400 for deliveries in 1999-2000.
April 1998	Asiana Airlines	Defers deliveries of A330-200s to 1999 or later. By May it has put all of its aircraft up for sale. Air Europe purchased 2 B767-300s, Delta one B767-300, QF one B747-400 and UPS has bought Asiana's B767 freighter
	Bouraq Air	Returns 2 B737-200s to lessors
	Cathay Pacific Airways	Intends to take delivery of 12 new aircraft but will sell 5 B747-200s. However, the lack of buyers has resulted in a decision to lease the aircraft.
	Garuda Indonesia	Sells 4 B747-200s and 5 A300s and then leases them back. Planned to sell 5 DC-10-30s, 4 B747-200s, 5 A300B4s and 5 Fokker-28s. Withdrew DC-10-30s from market after failing to attract offers at its going price.
	Malaysian Airlines	Continuing to negotiate delivery swaps and refinancing for 11 B777-200s and -300s and 9 B747-400s.
	Philippine Airlines	To sell 9 A300B4s and 11 B737-300s. Deferred 6 B747-400 (3 of which were due in 1998) and 3 A320 deliveries.
	Sempati Air	By March, Sempati had only 5 of its 25 aircraft in operation. Returns 4 A300s and 7 Fokker-100s to lessors
Singapore Airlines	Defers deliveries of 3 B777s and one B747-400	

Airlines. This alliance includes Japan Airlines and the feed traffic between Narita and Chek Lap Kok airport is important to both airlines. The current wave of alliance formation in Asia will help the region's airlines rationalise services, to consolidate traffic and to improve their finances, but they also will play a role in the deciding the competitive strength of the major global alliances at key Asian hubs.

Table 5: Alliance development involving Asian carriers 1997-98

Airline	Decision
All Nippon Airways, Lufthansa & United Airlines	ANA enters code share agreement with United Airlines and Lufthansa in preliminary move to join Star Alliance
Asiana Airlines & American Airlines	Formed a "strategic business alliance" involving code sharing and shared frequent flyer programme
Cathay Pacific Airways	Evaluating bids from BA/AA/JAL, Star Alliance and KLM/Northwest
China Eastern Airlines	Enters code share agreement with American Airlines
Japan Airlines & American Airlines	Code sharing on routes between Japan and USA
EVA & Continental	Code share and shared frequent flyer programmes
China Airlines & American	Code share and shared frequent flyer programmes
Malaysian Airlines & Swissair	Alliance on 3 weekly flights from Kuala Lumpur to Zurich
Qantas Airways	Enters code share agreement with Aerolineas Argentinas as part of a strategy to re-deploy capacity from Asia
Singapore Airlines, Delta & Swissair	Alliance breaks down as Singapore Airlines moves closer to Star Alliance. MOU signed in December 1997
Thai Airways International	Air France, British Airways, Lufthansa, Qantas and Singapore Airlines bidding for 25% share of Thai
Philippine Airlines	Northwest Airlines evaluating an investment in PAL
China Airlines	Enters code share with Northwest Airlines between Beijing and Detroit

Regulatory Responses to the Economic Crisis

The airlines clearly are realigning their capacity to the new demand conditions while setting themselves up to take best advantage of global airline groups and to pursue sustainable productivity improvements. However, the impacts of the economic crisis are so great there will be a temptation for at least some governments to provide their airlines with direct financial support and to protect them from competition. It seems likely that some of the financiers backing the airlines in their sale-and-leaseback deals believe that, ultimately, the governments of Asia will ensure their airlines remain solvent (Williamson, 1998). Also, equipment suppliers and their governments will be supportive of distressed airlines as appears evident with the success Korean Airlines has had in securing a low interest loan of US\$254 million (Mann, 1998). As pointed out above, the Government of Indonesia already has given sovereign guarantees in order for Garuda Indonesia to complete purchases of aircraft.

Governments also could step in to protect their airlines from competition, setting back the pace of liberalisation in Asia. However, there are good reasons to believe these options will not be favoured in

Table 6 continued: Regulatory responses in Asia Pacific 1997-98

Economy	Decision
Taiwan	Civil Aeronautics Administration puts pressure on airlines to merge to achieve greater stability and improvement in safety
Taiwan & USA	Open skies agreement gives greater access to USA and beyond for China Airlines and EVA and alliances emerging with American and Continental
Thailand	Transport and Communications Minister announces new policy to deregulate domestic market and to allow multiple designation on international routes, commencing with regional services (eg Indonesia). Restrictions on charter flights by Thai and foreign airlines to be lifted.
Thailand	Government increases foreign ownership limit in Thai by 10% to 30% and announces intention to reduce its own stake in Thai Airways from 79.5% to 49% or lower (pressures from IMF)

Conclusions

The Asian economic crisis has generated a considerable amount of pessimism about the prospects for the region's airlines. The carriers were highly exposed to currency risks and to a slowdown in traffic growth. While the economic crisis is reducing the amount of intra-regional traffic, the currency devaluations will stimulate more trips to Asia from North America and Europe. By virtue of the reduced costs of employing labour and other local inputs, the cost competitiveness of Asia's airlines has improved. However, the immediate problem facing the carriers is to refinance their debt, to realign their services and to match capacity to the weaker demand conditions. While this adjustment process continues, the world's mega-alliances are consolidating their position so that Asia's airlines are faced with difficult choices from a weakened position.

It seems likely that the end result will be fundamental changes in the way Asia Pacific aviation markets operate in terms of alliances, hubs, ownership, and regulation. Given the depth of the economic crisis in some Asian economies, a desire to protect national airlines would be understandable. However, the longer-term challenge for the Asian carriers is to turn the economic crisis into an opportunity to develop strategies that give them a sustainable competitive advantage. This will come about through productivity improvements that most likely will be pursued most aggressively in competitive conditions. At the same time, competitive airlines will need access to markets. Attempts to protect airlines could have negative consequences including pressure from the IMF and international financial community

In this paper, we have examined the initial responses of the airlines and governments. The evidence is mounting that the airlines themselves want the flexibility to adjust capacity, to enter new routes, to enter into alliances and to attract investment from the world's major carriers. Governments have shown a willingness to liberalise competition, to privatise and to allow foreign investment. Far from being a flight back to protection, the Asian economic crisis appears to have shifted attitudes of policy makers far more in the direction of liberalisation.

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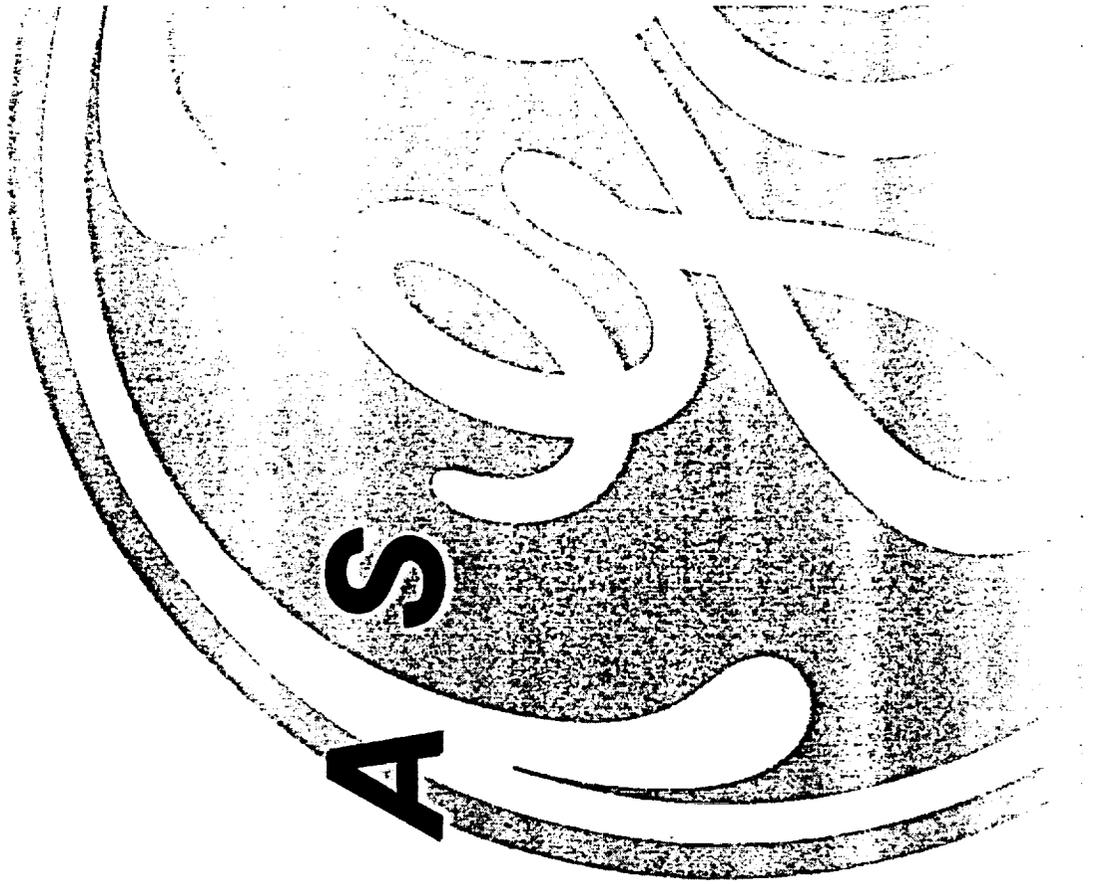
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G E C A S



INDUSTRY OUTLOOK APPROACHING THE NEXT
MILLENNIUM.

K. HOLDEN

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Introduction.

By any standards, 1997 was a banner year for the aviation industry. World passenger traffic increased by just under 7% over 1996 with the result that total demand was over one-third greater than just four years earlier in 1993 an average rate of increase of 7.5% pa or nearly 50% above the consensus forecast for long-run growth. While total deliveries of 100 seat jets increased from 438 in 1996 to 582 last year, the four year average of 490 pa was some 20% less than the consensus forecast of long-run demand. This almost unprecedented four year favorable trend in supply versus demand has resulted in load factors increasing from 66% in 1993 to 71% last year while the number of surplus aircraft declined from nearly 1,200 (11% of the world fleet) at the end of 1993 to 260 representing just 2% of the world fleet at the end of 1997.

The world's airlines recorded record net profits of \$7.5B last year compared with \$4.4B losses in 1993 which itself followed record losses of \$7.9B in 1992. The swing for the US airlines, which account for about one-third of world airline revenues, was even more impressive over this five year period going from a \$3B loss in 1992 to a \$4B profit in 1997.

Manufacturers, too, have benefited from near record orders for 1,348 new jets in 1997 (a 14% increase over the 1,186 ordered in 1996) bringing the firm order backlog up to 3,117.

In the leasing sector, the growing aircraft shortage showed up in terms of strong demand for most popular types of modern narrow-body and wide-body aircraft with a commensurate strengthening of lease rates.

One would have to go back to 1989 to find an equivalent state of euphoria to that which prevailed in 1997; at least until the last quarter of the year when the Asian economic crisis began to significantly impact growth in Asia.

A Ten Year Retrospective.

Coincidentally, 1989 was also the first year in which I contributed the Industry Overview for the Airfinance Annual. The forecast for Jet Aircraft supply and demand through 2000 summarized therein included the following explicit projections for 1997 with which the actual 1997 outcome (excluding 50 seat regional jets) can now be compared:

	Forecast	Actual/Variance
• 1997 RPMs:	1,774B	1,716B/-3.3%
• Traffic Growth Rate:	6.1% pa	5.7% pa
• 1989-1997 Deliveries:	5,230	5,437/+207
• 1989-1997 Retirals:	1,809	1,237/-572
• Net Fleet Increase:	3,421	4,200/+779
• 1997 Fleet:	11,300	12,061/+6.7%
• 1997 Average Aircraft Size:	+9.5%	+2.0%
• 1997 Seats (vv 1988):	+57.1%	+56.5%
• Peak Aircraft Surplus:	10.6% in 1993	11.2% in 1993
• 1997 Aircraft Surplus:	1.0%	2.0%
• Operating Lease Fleet:	2,400 aircraft/23% of fleet in 1995 (versus actual 2,700 aircraft/22.5% of fleet in 1997)	

Several conclusions can be drawn from this. On the positive side, traffic growth, total capacity (seat) growth and cyclicity were all pretty accurately forecast, with the 1993 aircraft surplus in particular having been almost precisely predicted. The forecast for operating lease market growth was also accurate. On the negative side, like most other forecasters I grossly over-estimated both retirements and the rate of increase of average aircraft size. The obvious lesson is that this is an industry where medium term macro forecasts are a reliable basis for future planning in terms of both the overall requirement for aircraft seats *and* the play-out of the cycle, whereas they are much less reliable when it comes to predicting the precise way in which that demand will be satisfied in terms of specific aircraft types and also in terms of adding new aircraft versus keeping old ones in service as long as possible.

Demand for Aircraft:

This analysis confirms that we are fortunate to participate in what is fundamentally a very predictable business taking a 10 to 15 year view. The need for aircraft and finance which is of course what most interests aircraft financiers is fundamentally underpinned by passenger traffic growth and the only real uncertainty, as always, seems to be the degree to which this driver might *exceed* 5% pa with only a very few forecasters predicting anything less. Though, having said that, the current economic turmoil in Asia is perhaps for the first time ever causing people to question the magnitude of the Asian part of the growth equation on which most forecasts are premised, at least in the short term. While still too early to tell precisely, it seems likely that the impact of recent events in Asia will be to reduce global aircraft demand over the next five years by some 300 units relative to that previously predicted with wide-body demand being the most affected segment.

Based on this, and taking into account the output of the last two Transportation Research Board Workshops, in Fall 1995 and Fall 1997 [Fig 1], it still seems reasonable to rely for planning purposes

on the following broad assumptions as to the likely demand for 100+ seat commercial jets over the next ten to fifteen years :

- 5%+ pa Traffic Growth
- 300-400 pa Increase in the World Fleet
- 250-300 pa Retirements
- 550-650 pa Aircraft Required
- \$35-40B Annual Cost (in 1997 dollars)

Again in very round terms, and taking the upper end of this demand spectrum, some 400 of the required aircraft will probably be narrow-bodies and 250 will be wide-bodies. The immediate problem of course is that Boeing is alone set to build 370 narrow-bodies in 1999, while Airbus, although set to build only 205 in 1999, is publicly committed to capturing at least 50% of the self-same market [Fig 2]. As a result, short-term narrow-body production rates are likely to exceed long-run demand by approximately 50%.

Simply because production rates this close in are substantially underpinned by firm orders, and because this high level of demand for narrow-bodies is a direct reflection of the industry's need to operate totally Stage 3 fleets in the US by 2000 and in Europe by 2002, this is not a concern for 1999, nor indeed possibly for 2000 depending on how well traffic growth holds up. It will, though, be a matter of increasing concern from 2001 on as with the hushkitting issue by then out of the way, this will be a period of below average narrow-body retireals. The key issue here will be the way in which the manufacturers individually and collectively react to the inevitable fall-off in narrow-body demand post-2000.

This brings me neatly to cyclicalilty.

Cyclicalilty:

I have in previous contributions to the Airfinance Annual referred to the inherently predictable nature of cyclicalilty in this industry, and nothing better illustrates this than Fig 3 which tracks key events through the last three complete cycles. This is further

supported by the retroactive accuracy of my 1989 forecast in this respect. Without focusing on the numbers in detail, it is evident that these three cycles were remarkably similar, not only in terms of their timing and duration, but also in terms of peak/valley ratios of orders and deliveries. And the current cycle looks to be playing out in a very similar fashion, albeit in a shorter time-scale. My personal belief is that cycles in our industry are driven primarily by internal industry characteristics rather than by external events though external events frequently act as the trigger that starts the industry on its next down cycle. In this regard, the Asian economic crisis will probably be seen retrospectively as having been the key downside trigger for the current cycle.

The length of time taken to build aircraft and the related speed at which production can be increased or decreased in response to demand is in my view the underlying cause of cyclicity. With these times having recently been cut in half relative to the '70s and '80s, it seems to me likely that cycles will generally be somewhat shorter than in the past, and the speed at which narrow-body production has been ramped up since the 1995 low virtually guarantees that this will be the case in the current cycle [Fig 4].

The critical issue, which I alluded to earlier, is the way in which the industry generally, and the airframe manufacturers in particular, react when narrow-body demand peaks and starts falling off. Will they learn from experience and pro-actively match production to demand thus helping us achieve a soft landing this time around? or will they instead maintain excessive production levels for too long and thus exacerbate the next down-cycle as happened in 1991? And equally important, will the pattern of external events help smooth out the cycle or will they exacerbate it? Particularly important here will be the timing of the next US or European economic slow-down and the as yet unknown economic and business impact of the Year 2000 computer problem.

Financing Trends.

One of the most dramatic changes in the last 15 or so years has been the growth in the number of airlines that lease some or all of their aircraft with the number leasing *all* of their aircraft up from 46 in 1986 to 214 in 1996 [Fig 5]. This is matched on the other side by a decline in the number of airlines that own *all* of their aircraft down from 127 in 1986 to 83 in 1996. This suggests to me that more and more airlines are recognizing the benefits of using all three forms of financing that is a balance sheet optimized combination of outright ownership and tax based finance leasing for core assets, and operating leasing for developmental and non-core assets. While many different factors are involved, I believe that one factor is a growing realization that investing in aircraft is at least in the short term a far from risk free proposition if new aircraft price escalation is low. Given its reputation as one of the world's best and most innovative large carriers, it is highly significant that British Airways decided to go the operating lease route in setting up its low cost 'Go' subsidiary.

Turning to financing trends, recently up-dated figures show continuing growth in the number of aircraft on operating lease with this form of financing today being used for some 22.5% of all aircraft in the world jet fleet or 2,700 in total. While the overall mix between ownership, finance leasing and operating leasing for modern aircraft is much the same as it was five years ago, namely 21% on operating lease, 30% on finance lease and 49% owned, there continue to be significant variations around the world [Fig 6]. Outside of the US, however, there is some evidence of a progressive shift towards more balanced financing solutions along the lines of the European model which suggests that a degree of maturity is now emerging in global financing patterns.

This will of course be greatly influenced by airline profitability and cash flow and this will in turn depend on the play-out of the cycle. Ed Greenslet's comprehensive forecast of world-wide airline profitability and financing requirements in last November's issue of the Airline Monitor shows that outside the US, the airline industry is likely to need large amounts of external financing over the next five years as they struggle to pay for new aircraft being

bought primarily for growth [Fig 7]. Conversely, the larger US airlines are likely to have little or no need for external financing over the next ten years [Fig 8].

Aircraft Prices and Values:

Leasing maths is not particularly complex with profits being a function of just four variables; Original Cost, Lease Rate and Lease Term, Cost of Money, and Residual Value at the end of the lease term. With the market determining lease rates and terms, and with money increasingly a commodity, profit is in practice determined almost entirely by the prices at which lessors and financiers buy and sell their aircraft.

On the buy side, it is a fact that for large buyers, new aircraft today cost little more than they did in the early 1990s and this is reflected in the fact that lease rates in today's tight market are in many instances not hugely greater than those that were achieved in the late 1980s at the peak of the last cycle. With list prices escalating steadily due to the automatic application of the manufacturers' standard escalation formula which takes account of increases in labor and materials cost only with no offset for increased productivity, there is a growing disparity between list prices and net prices that is an increasing source of confusion and uncertainty. Based on an analysis of three popular models, the 737 and 767 from Boeing and the A320 from Airbus, it seems that average appraised values for new aircraft are today around 85% of list price including the cost of funding progress payments while distress values are around 70%.

In this environment, what looked like a bargain yesterday may well not be so attractive today, and with deflation an additional threat, there is little reason other than slot availability to firmly order large numbers of aircraft many years ahead. This is one of the reasons why GECAS aims to maintain as much flexibility as possible in our new aircraft orders, both through the use of options and by incorporating as many model conversion rights as possible, so as to position ourselves to give our customers what they want, when they want it.

On the sell side, the science of appraiser forecasting of future values remains as much a black art as ever. Take the case of a 1992 Boeing 737-300 with CFM-56-B2 engines, a new one of which nominally listed for somewhere around \$36.5mm last summer. Appraisers generally agree that such an aircraft was last year at age five worth around \$27mm or 74% of the list price of a new aircraft of the same type. Going out to 2008, six well known appraisers quote inflation inclusive future values ranging from a low of \$11.3mm to a high of \$24.9mm [Fig 9] an over 2:1 uncertainty factor ten years hence as to the value of one of the world's most popular investment aircraft.

BK's comprehensive analysis of historic transaction data suggests that future values ought not to be as unpredictable as that since the long-run average is pretty stable at around 70% of replacement cost at age 5; 50% at age 10 and 35% at age 15 . What this masks of course is a huge variation in residual value retention between different types and at different points in the supply/demand cycle. Historically, aircraft built in 1986 were ten years later worth between a low of just under 30% of original sticker price and a high of just under 80% taking inflation into account [Fig 10]. No prizes here for guessing which were the winners and which were the losers! Similarly, values of all types tend to fluctuate by at least plus or minus 10% around their long-run levels through the cycle depending on supply versus demand. Armed with this wealth of historical evidence, it is surely not too much to ask that appraisers should be required to declare more explicitly their methodology and assumptions so that we can understand precisely why their forecasts are so different. If this was done, it is my personal belief that the range of future value estimates would become distinctly narrower and therefore be of more value to investors. Meanwhile, those asset managers that truly understand the drivers of aircraft value will do better for themselves and their aircraft owners than those that don't.

Manufacturer Competition and Prices:

I will close by commenting briefly on the linked issues of manufacturer competition and building aircraft more efficiently.

It is probably true to say that despite the fact that the manufacturers' order books are now pretty well full through 1999 and 2000, competition has rarely ever been fiercer on both the airframe and engine fronts. Why is this? The root cause in my view is that with only two significant airframe manufacturers left, the fight for market share is being driven by conflicting and ultimately irreconcilable objectives. Thus Boeing has an essentially 70% market share and wants to keep it, while Airbus is strongly committed to achieving a 50% market share. This is most vividly apparent in the narrow-body sector where Airbus already claims parity with Boeing, yet will in 1999 be delivering only a shade over half as many narrow-bodies as its competitor. In this situation, almost every campaign now becomes a no holds barred 'shoot-out' regardless of the size of the order.

Logically, this fierce competition should ease as more and more customers are won by one side or the other, but this will depend greatly on the degree to which current campaigns are or are not being priced at or below long-run break-even cost levels and this in turn depends critically on the extent to which production costs can be further reduced.

This is the single greatest unknown in an industry which has traditionally taken it for granted that new aircraft prices automatically increase somewhat faster than consumer prices generally. Is the recent experience of relatively flat aircraft prices an anomaly, a one-time correction, or a portent of things to come? If the latter, its a real 'game-changer' for aircraft financiers since inflation can no longer be counted on to compensate for inadequate lease rates. While none of us can know the answer to this key question, the current difficulties being experienced by Boeing suggest that the manufacturers have at the very least over-estimated the *pace* at which production processes can be simplified and speeded up.

Conclusions:

As we head towards the millennium, our industry is overall in pretty good shape, albeit probably soon approaching the top of the current cycle, with strong players everywhere and with better focus on completely satisfying the needs of its customers profitably a key GECAS goal.

If we are lucky, and if we apply the lessons learnt in the painful recession in the early '90s, there is every reason to believe that the industry can work its way through the next down-turn without too much difficulty, though the winners will as always be those businesses and individuals that combine an in-depth understanding of the dynamics of this complex, but ultimately relatively predictable, industry with deep-pocket financing.

**K.J.Holden,
Executive Vice President, Business Development and Strategy,
GE Capital Aviation Services.**



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Consensus Forecast of Future Average Annual Jet Aircraft Demand over the Next 10 to 15 Years (100 Seats and Above)

	Range	TRB'95 '95-09	TRB'97 '97-11
• Passenger Traffic Growth (RPMs)	5% 0 -6%	5.0%	5.0%
• Capacity Growth (Seats)	4% 0 -5%		
• Fleet Size Growth (Number of Aircraft)	3% 0 -4%		
• Net Fleet Increase (Number of Aircraft)	300-400	314	358
• Annual Retirements (Number of Aircraft)	200-300	249	289
• New Aircraft Demand	550-650	563	647
– Narrow-bodies	300-400		
– Wide-bodies	200-250		

Source: 1995 & 1997 Transportation Board Workshops

Long-term, 600+ New Jets a Year Needed at an Aggregate Cost of \$35B - \$40B Annually



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Narrow Body Production Levels Are Once Again Rising to Record Levels

1999 Narrow Body Production Rates

Boeing:	B737	272
	B757	56
	MD90/B717	42

Total	370
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Airbus:	A319/320/321	205
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575

Source: Paribas Capital Markets

Over Supply Likely From 2000 On?



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Industry Cycles

Source: Airline Monitor

	1st	2nd	3rd	4th	5th?
Up Cycle Starts (orders > deliveries) Boom Years	1958 8	1972 7	1985 5	1995 3	2002? ?
Up Cycle Peaks (orders peak) Orders / Deliveries Deliveries > Orders Deliveries Peak Orders Trough % of Peak Orders Deliveries Trough % of Peak Deliveries	1965 2.7 1967 1968 1971 24% 1972 32%	1978 2.4 1980 1980 1982 28% 1984 60%	1989 2.4 1991 1991 1994 27% 1995 59%	1997 2.0 1999 ↓	?
Down Cycle Ends	1972	1985	1995	2002?	

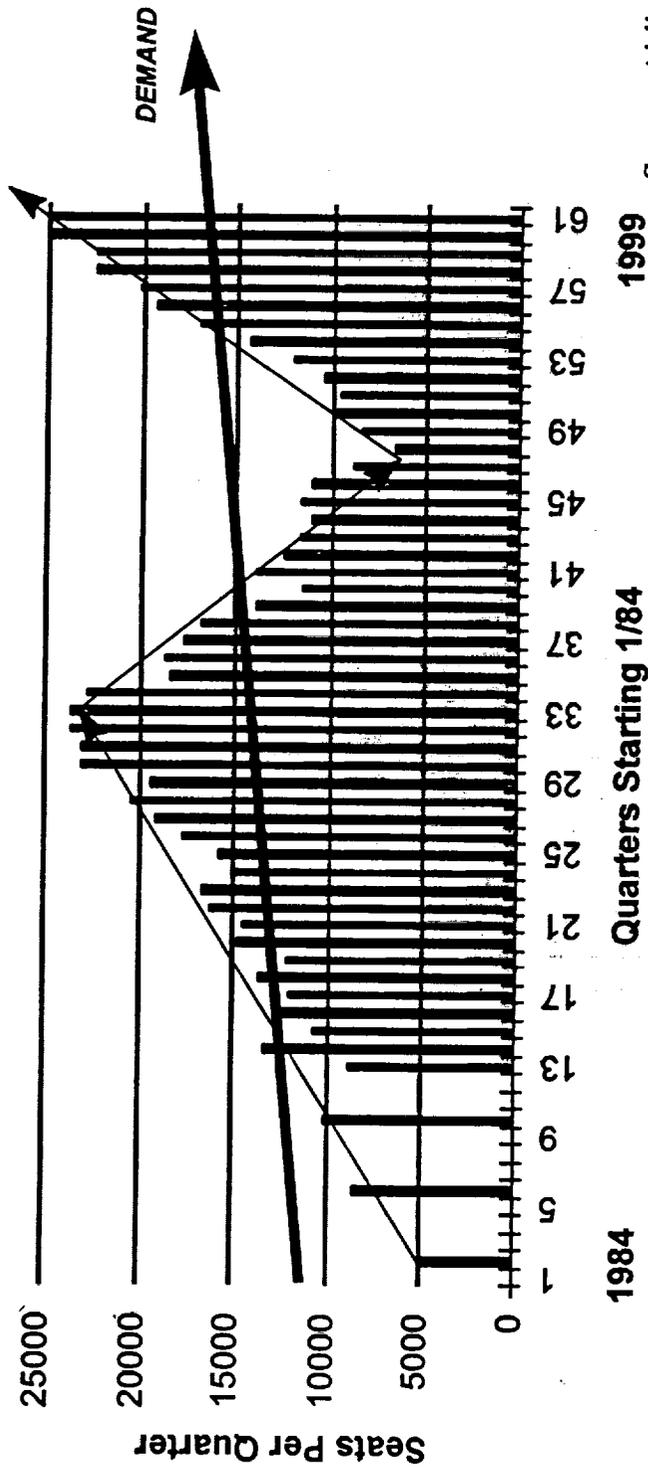
Timing of Next Down Cycle Becoming Increasingly Clear



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Shorter Aircraft Build Times Are Causing Industry Cycles To Shorten and Become Less Predictable

Narrow-Body Production Rates: 1984-1999



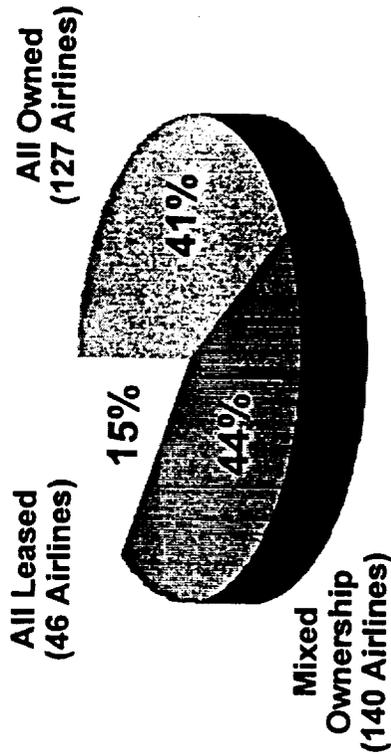
Source: Airline Monitor

Production Rates Building Twice as Fast as in Last Cycle

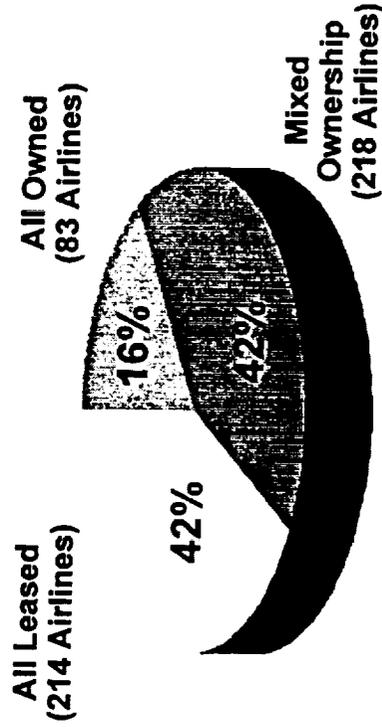


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More and More Airlines are Opting to Lease Some or All of their Aircraft



1986
313 Airlines
5,960 Aircraft



1996
515 Airlines
9,632 Aircraft

Source: Airclaims

Almost all Airlines now Lease some of their Aircraft

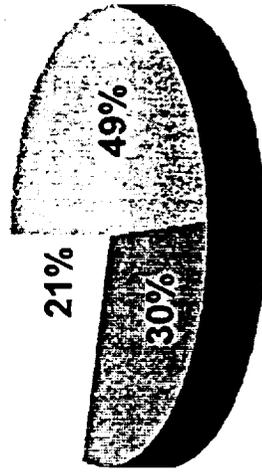


GE Capital Aviation Services

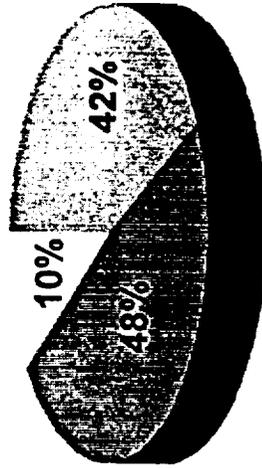
■ Owned
▨ Finance Leased
■ Operating Leased

Mid-1997 Financing Market Shares (Post 1985 Jets)

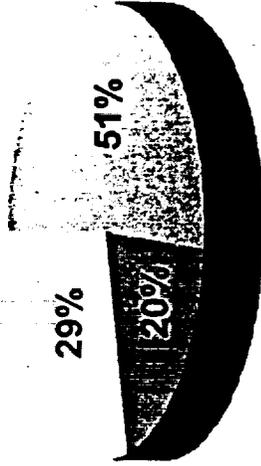
WORLD



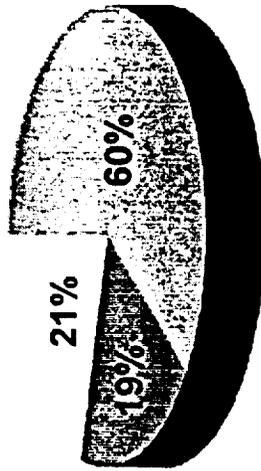
NORTH AMERICA



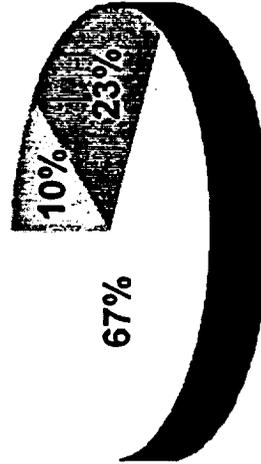
EUROPE



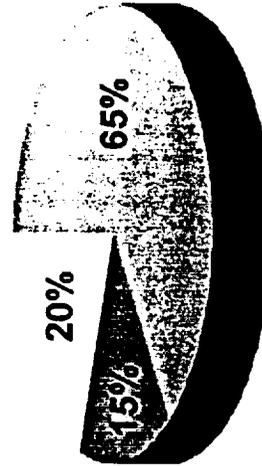
ASIA/PACIFIC



LATIN AMERICA



AFRICA & MID-EAST



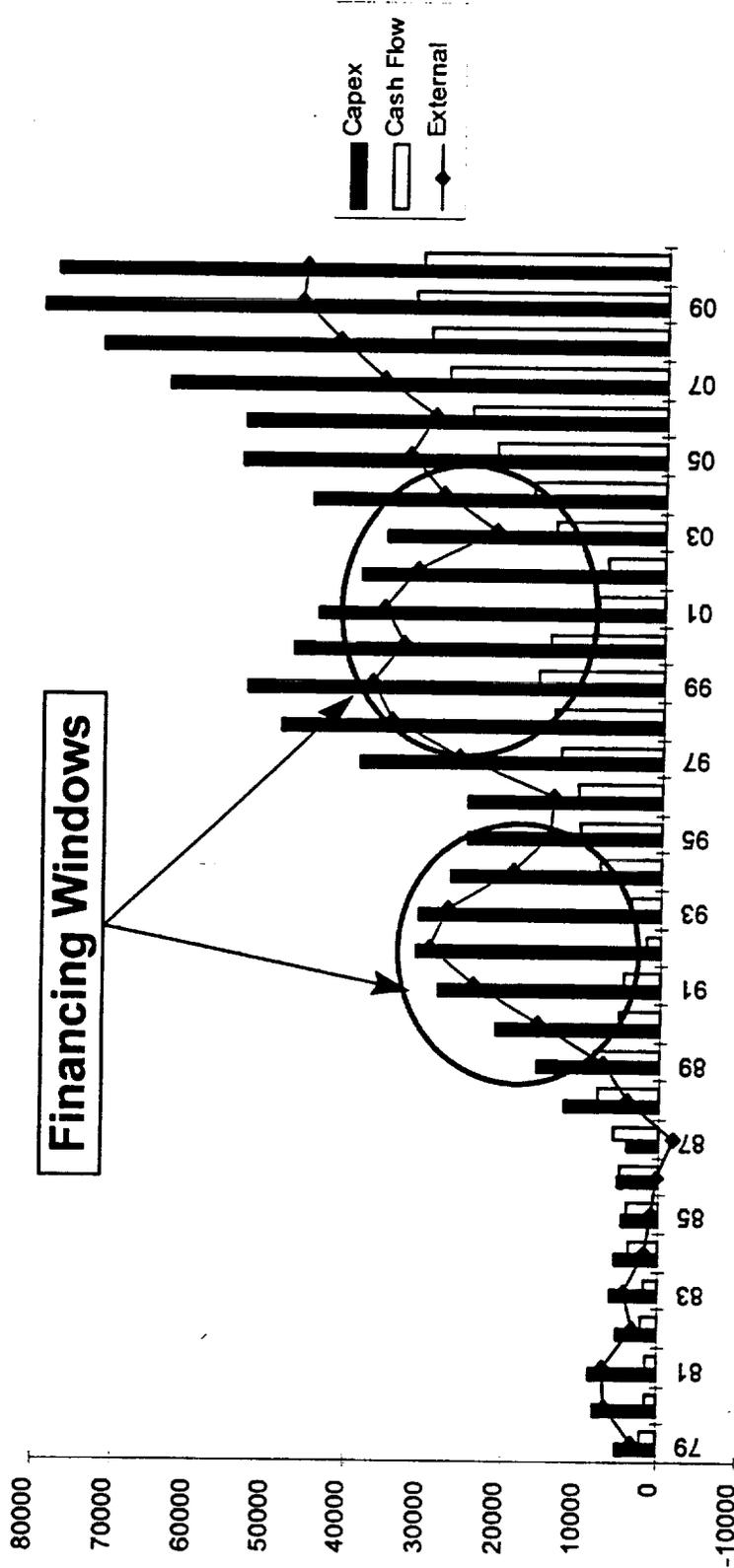
Source: Airclaims

Financing Mix Varies Around The World



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Non-US Airline Capital Funding: 1979-2010



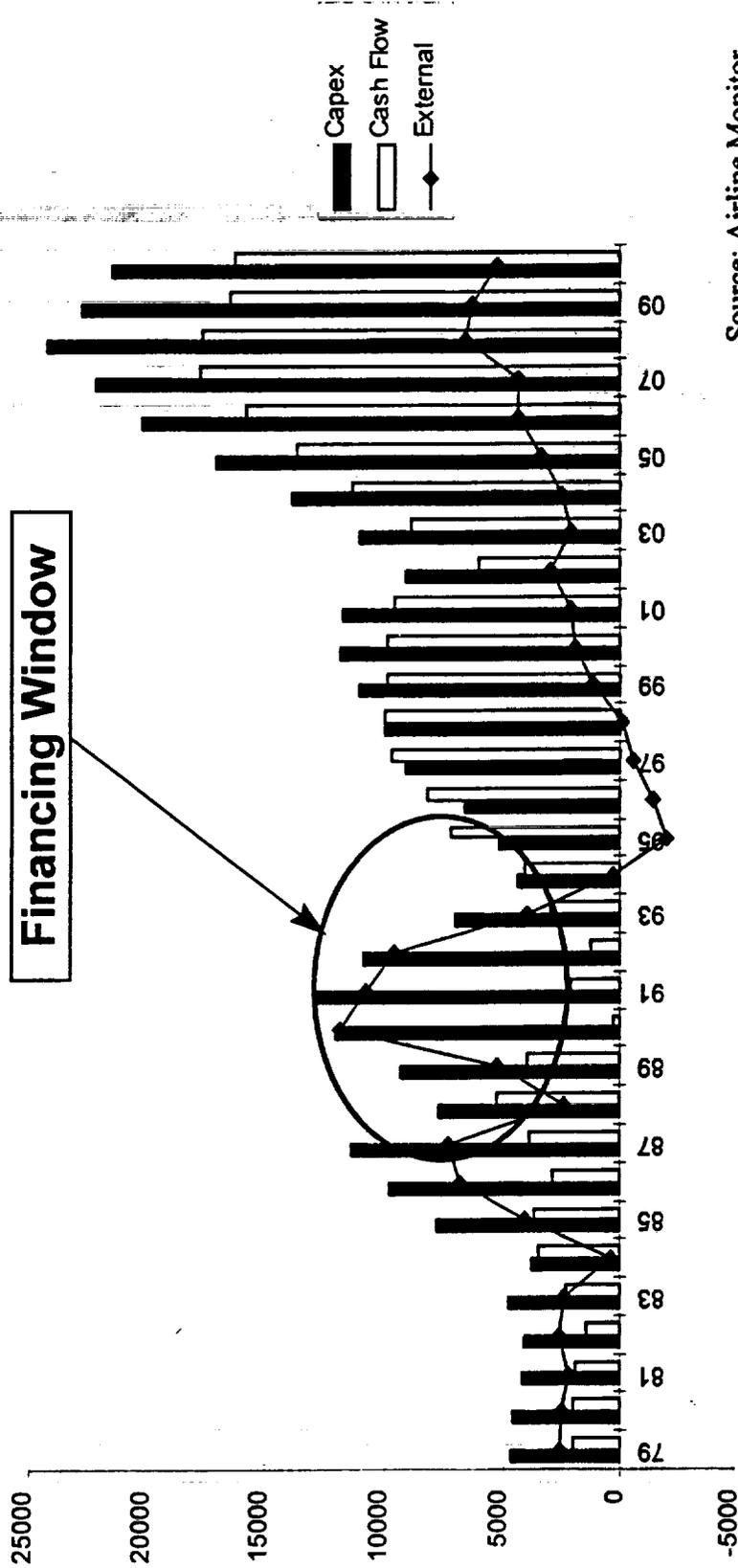
Source: Airline Monitor

**Non-US Airlines Face A Significant Financing Shortfall At
The Turn Of The Century, Whereas**



GE Capital Aviation Services

US Airline Capital Funding: 1979-2010



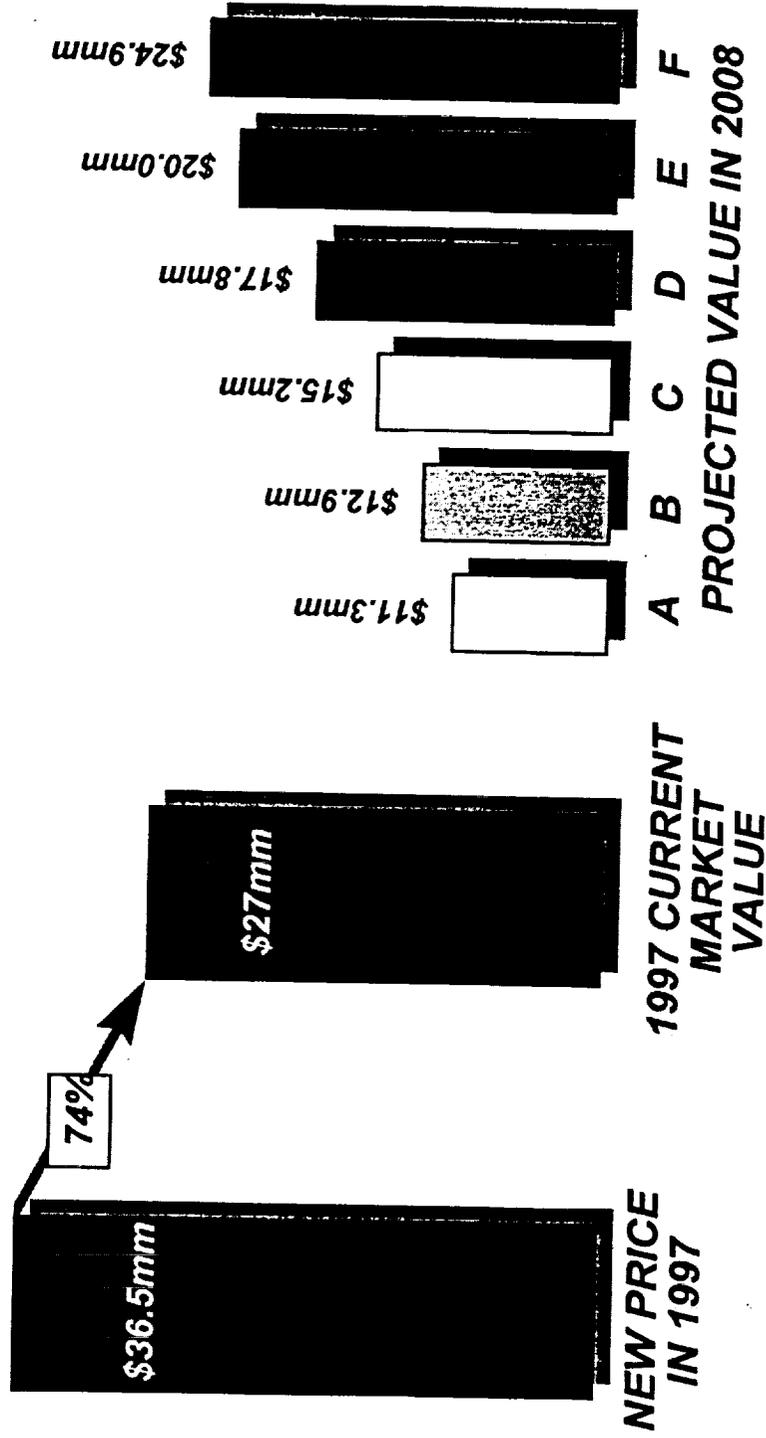
Source: Airline Monitor

US Airlines Should Be Largely Self-financing Through 2010



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Future Value Estimates for a 1992 B737-300 Vary By Over Two to One

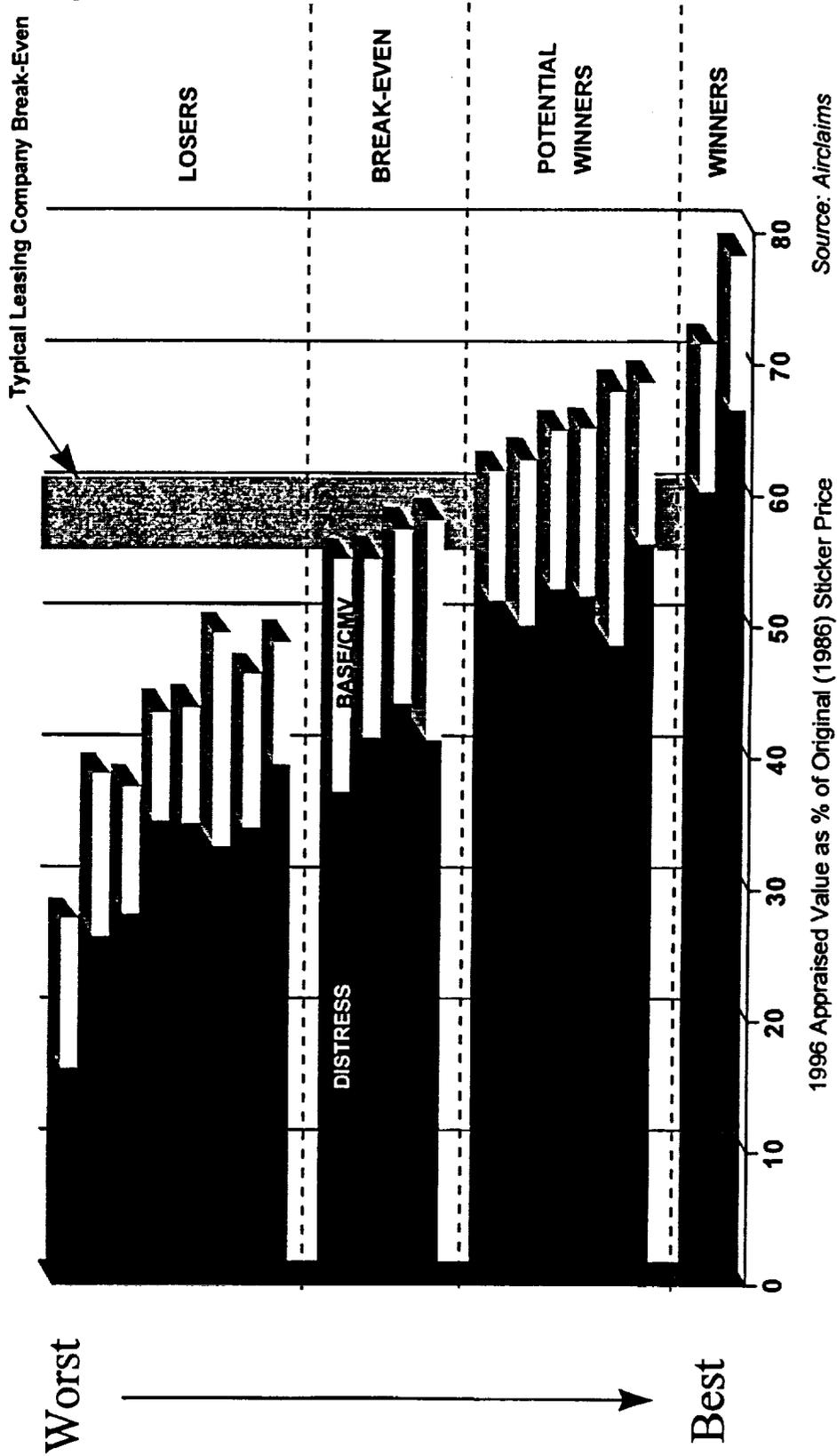


Appraiser estimates of Future Values are of limited use in financing aircraft over ten to fifteen year terms



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New Aircraft Value Retention: 1986-1996



All Aircraft are Not Equal!

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An Empirical Analysis of Japan's Domestic Airline Markets

Part 1

Airfares under the Regulatory Regime: What will be expected after the revision of the current charging system?

Part 2

Demand/Supply System and Operations Management

by

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Abstract (Part 1)

This paper statistically investigates the charging system of Japanese domestic airfares and predicts the effect of the revision of the current system on the consumer's surplus. Using 222 observations of cross-sectional data from 1995, Part 1 of this paper empirically demonstrates that (a) the airfares in the long haul routes were set relatively high regardless of the number of passengers, (b) in the outstandingly dense routes, the airfares were set higher than the predicted full cost levels, and (c) in the thin and shorter haul routes, airfares were a little lower. Considering the price elasticity of these three types of routes, this paper concludes that the reduction of airfares in the

long haul routes (especially dense routes) to the "distance-proportional levels" would lead to a substantial gain in consumer's surplus. Furthermore, this gain would surpass the loss of consumer's surplus that might arise in shorter haul routes. There still remains substantial room for the Japanese government to improve the consumer's benefit without worsening, and possibly even improving, the status quo of the airlines.

Abstract (Part 2)

Part 1 uses the simultaneous equation model that is derived from the assumption that Japanese airlines maximise their profits under the regulated fares. This model consists of Marshallian demand function, fleet size function and load factor function. Part 1 mainly uses the demand function in order to discuss the expected change of consumer's surplus after the regulatory reform. Part 2 discusses demand and supply balance and airlines' operations by highlighting on load factor function and fleet size function. In fleet size function, the number of passengers, the number of departures, and distance-controlled airfares determine the optimal fleet size. In addition, distance-controlled airfares, consent ratio, the number of departures and fleet size determine the load factor.

Using the same data set as Part 1, this paper finds these following results for three types of markets ("long-haul & big", "short-haul & small" and "in between").

- (1) Only in the short haul markets the decrease of airfares (controlled by distance) tends to cause a higher load factor. This result implies that there are incentives for airlines to do yield management by lowering the airfares, once airfares are deregulated. On the other hand, in the groups of long haul routes, airlines don't have this kind of incentive. This is supported by the fact that there were very few cases of discounting airfares especially in long haul and thin markets following the minor regulatory revision in June 1996.
- (2) Flight frequency, together with Herfindahl index, has the positive effect on load factor. This is similar to the US case prior to deregulation (See Douglas & Millar (1974b)). This implies that there exists the possibility that airlines will request the governments to excessively increase the number of their own departure especially for small markets as the capacity of domestic markets is enlarged or the domestic markets are more deregulated.

1 Introduction

The Japanese domestic air routes have been tightly regulated in terms of charging airfares, frequency, entry, and exit throughout the era of the so-called "Old Regime (1972-86)" and that of the "New Domestic Policy (1986-Present)"¹. Under both regulatory eras, the Japanese Ministry of Transport (hereafter MoT) used annual passenger volume thresholds for dense routes to regulate the number of carriers servicing a route. As part of the New Domestic Policy (1986-Present), these thresholds were gradually lowered. The thresholds were finally abolished completely in April 1997. In contrast, the charging system of airfares had hardly been revised prior to 1996 except for the slight changes in 1989 and 1990². However, in May 1996, the MoT allowed each airline to freely choose to set its airfare within a 25% range below a maximum airfare and expanded the availability of discount airfares. However, a number of normal airfares of large routes were raised. Thus, it seems as though this "nominal" policy revision has not necessarily evoked the desired effects in the airline industry³.

¹ The Japanese domestic market for airline travel totaled 74.55 million passengers in 1994 (6.1% of the world air passengers). The domestic market shares for the Japanese airlines, measured by percentage of the number of passengers, were as follows: All Nippon Airways (ANA) 45.7%, Japan Airlines (JAL) 22.9%, Japan Air System (JAS) 20.8%, Air Nippon (ANK, the subsidiary company of ANA which mainly operates between small local routes) 6.1%, Japan Trans Ocean Air (JTA, the subsidiary company of JAL which mainly between Okinawa islands and Okinawa to Honshu) and the others 1.5 %. The data source is *Koku Tokei Yoran (Aviation statistics Summary, annually published)*, Nihon Koku Kyokai, 1996.

² In these revisions, the fares were slightly lowered in the across-the-board way because of the change of tax system. The fares of north and southbound routes, which had been set higher in order to offset the loss of revenue due to the irregular climate change, were also reduced.

³ More detailed information about the policy of Japanese domestic and international aviation policy is depicted in Yamauchi and Murakami (1995) and Yamauchi and Ito (1996). In 1998, being allotted some slots in Sapporo, Tokyo (Haneda) and Osaka (Itami), the new entrants (Skymark Airlines and Hokkaido International Airlines) are supposed to operate in such a dense trunk route as Tokyo-Sapporo (about eight million passengers carried per year) by charging a much lower price. This may stimulate the fare competition among airlines, but the frequency of these airlines will be

The primary purpose of the airfare regulation has been to cross-subsidize the deficit-ridden local routes with trunk and other large local routes. This policy has enabled domestic airlines to expand their route networks without cutthroat competition, protect profits for reinvestment, and maintain stable management of growth⁴.

Judging within this context, the airfares of large (i.e., dense) routes are set higher above the commonly assumed levels, namely the "distance-proportional levels". As a result, the consumer's surplus in these routes has been converted to compensation for the deficits that come about in thin and/or small routes. This paper firstly focuses on the welfare analysis of Japanese domestic airline markets by modeling and estimating the Marshallian demand functions for three groups of markets.

The regulatory circumstance stated above also affects the operations management behavior. Under the circumstance in which airfares and entry/exit are regulated, airlines cannot choose airfares or flight frequency as strategic variables for profit maximization. Therefore, one of the strategies which is left for Japanese airlines for profit maximization is to carefully choose their fleet size in order to minimize their operational cost. Assume that there is an airplane which serves between point A and B. Japanese airlines flexibly place the airplanes depending on the demand and supply balance. In addition, the behavior of placing optimal airplanes is, in a sense, regarded as the supply behavior. Airlines are expected to locate a large airplane in a lucrative market, and at the same time, sensitively adjust the fleet size by referring to the number of flights in order to prevent the excess capacity.

In addition, load factor is also an endogenous variable. This idea was introduced by Douglas and Miller who modeled and tested the quality competition in the regulated US domestic markets. This paper derives the load factor function from the profit maximization model and rearranged its explanatory variables. As a result, load factor is determined by distance-controlled airfare, fleet size, flight frequency and market concentration. Among these variables of the load factor function, flight frequency and fleet size can be used to check whether there exists excess capacity. In addition, the relationship between distance-controlled airfare and load factor can explain airlines' mutual incentives for yield management.

This paper consists of Part 1 and Part 2. The remainder of this paper is organized as

much less than that of "Big 3 (JAL, ANA, and JAS)". It is not certain that these new entrants can survive the competition in these routes.

This paper consists of Part 1 and Part 2. The remainder of this paper is organized as follows: both Section 2 and Section 3 are common analyses for Part 1 and Part 2. Section 2 provides a preliminary data analysis. Section 3 defines the relevant variables and develops both theoretical and empirical models for the Japanese airline industry. Section 4 and 5 belong to part 1. Section 4 derives statistical tests for the part of the proposed models and does the welfare analyses of Japanese domestic airline markets. Section 5 concludes with a summary of results for Part 1 and comments regarding political implications of the findings.

Part 2 consists of Section 6 and 7. Section 6 explains the patterns of airlines' supply behaviors and analyses the existence of excess capacity for three groups of Japanese airline markets by using the same model and data introduced in Part 1. This section also try to analyze airlines' incentives for yield management for three different types of markets. Section 7 is a summary of results for Part 2 and refers to policy implications for further deregulated markets.

2 Preliminary Analyses

(1) The Structure and Variation of Japanese Domestic Airfares

Most Japanese domestic airfares, other than those charged by commuter airlines, are determined such that the total revenue from them will cover the total cost for each firm⁴. This does not guarantee that the revenue from each route will cover its total cost. In principle, the common technique of pricing airfares would dictate that the airfare for each route be set such that it is approximately proportional to the distance. This method has generally been accepted as the most effective remedy for dealing with the consumer's feeling of inequality or discrimination in pricing under the previous system of cross-subsidizing airfares. However, even under the new system, the airfares per distance actually vary among the routes despite the fact that we, researchers, can distinguish the factors that cause the cost differences (for example, whether the fleet consists of turbo-prop aircraft or not).

⁴ Yamauchi and Ito, *ibid.*, p.38.

⁵ On the other hand, the fares of commuter routes are determined so that the revenue of each route will cover the cost of the route. Eventually, the fares per distance of commuter routes are set higher

A regression of the airfare per distance versus the stage length may be used to illustrate the extent to which airfares vary. This regression is performed below using the log linear form of the dependent variable and employing dummy variables that reflect the differences among the routes. The longer the stage length is, the lower the airfares per distance are expected to be, because the operating costs decrease, as the stage length is longer. As a result, the sign of the coefficient estimated for the stage length variable is expected to be negative (i.e., the convex curve may be expected). The function to be estimated may be regarded as an alternate form of the average cost curve. This airfare per distance function is also an alternate the quasi-marginal cost curve of the domestic, since the marginal cost curve of operation slopes downward as the stage length grows longer. If the statistics of the estimated function are found to be substantially significant, it can be said that the domestic airfares are set at "relatively" reasonable levels. The reason is that they are interpreted as being charged as though they were determined by quasi-marginal cost pricing (which covers the total cost of operation because here we assume marginal cost curve almost overlaps with average cost curve).

The original form of the equation to be estimated is as follows (hereafter, Model 1):

$$\begin{aligned} \ln(P/D) = & a + b \cdot \text{DOKINAWA} + c \cdot \text{DISLAND} + d \cdot \text{DEXP} + e \cdot \text{DNARR} + f \cdot \text{DTURBO} + g \cdot \text{DYS} \\ & + h \cdot \text{DTR} + (i + j \cdot \text{DOKINAWA} + k \cdot \text{DISLAND} + l \cdot \text{DEXP} + m \cdot \text{DNARR} \\ & + n \cdot \text{DTURBO} + o \cdot \text{DYS} + p \cdot \text{DTR}) \cdot \ln(D) + \mu \end{aligned}$$

where μ is the error term, D is the stage length of each route, and P/D is the round trip normal airfare per D . All the following variables are dummy variables, all of which are likely to affect the cost structure.

DOKINAWA: 1 for the routes serving Naha International Airport in Okinawa Island, and zero for the others. For example, the landing fees charged at the airport in Okinawa Prefecture are set lower than other landing fees in Japan in order to promote the tourism for Okinawa, the prefecture of the lowest income.

DISLAND: 1 for the routes serving the isolated islands other than Okinawa Island, and zero for the others. In these routes, commuter aircraft of less than 20 seats (DHC-6) are employed. These smaller jets are exempted from the usual jet airplane taxes.

DEXP: 1 for the routes which can be regarded as competing with Shinkansen Express, (namely, for

than those of trunk and local routes.

the routes along which Shinkansen serves direct service: Tokyo-Osaka, Tokyo-Fukuoka, Osaka-Fukuoka, Nagoya-Fukuoka, Tokyo-Hiroshima, Tokyo-Okayama, Tokyo-Yamaguchi-Ube, Tokyo-Kitakyushu, and Tokyo-Yamagata), and the others zero⁶. They are assumed to compete with Shinkansen Express. The airfares of these routes are expected to be lower than those of the others.

DNARR: 1 for the routes where such narrow-bodied aircraft as DC-9, MD-80s, B737, and A320 (128-166 seat configuration) are operated, and zero for all other routes. In these routes, the economy of density is expected to be greater than in other routes. That is, the average cost curve is expected to slope downward more steeply.

DTURBO: 1 for the routes where commuter aircraft (SAAB 340B, 36 seat configuration) are operated, and zero for all other routes. The tax for jet aircraft is not applicable to turboprop aircraft. Furthermore, the economy of density for YS-11 flown routes is expected to be greater than the economy of density in the routes where full sized jet aircraft are used. The routes included in **DISLAND** are excluded from **DTURBO**⁷.

DYS: 1 for the routes where YS-11 (64 seat configuration turboprop aircraft) is operated, and zero for all other routes. Similar to the case for **DTURBO**, input cost saving and strong economies of density are also expected. However, the YS-11 is such an aged type of aircraft that many of them have already been retired. The two cost advantages stated above may be offset by the cost inefficiency (e.g., extra maintenance cost) of operating with older aviation technology.

DTR (trunk dummy variable): 1 for Tokyo (Haneda)-Sapporo, Tokyo-Osaka (Itami and Kansai), Tokyo-Fukuoka, Tokyo-Naha, Osaka (Itami and Kansai)-Sapporo, Osaka-Fukuoka, Osaka-Naha, Fukuoka-Sapporo, Fukuoka-Naha, and zero for all others. In these dense routes, relatively larger aircraft (B747-400D or B747SR, 528-569 seat configuration) are operated than in the other routes of about the same stage length where B767s (234-288 seat configuration) are used. The cost per passenger of the trunk route is expected to be lower than that of the other routes of the same stage length. However, if the airlines abuse the power of the oligopoly and elect to collude when they apply for airfare approval from MoT, P/D could turn out to be relatively higher than the model would predict. Clearly, this dummy variable will affect the $Ln(P/D)$ function, but the above

⁶ Non-direct routes of Shinkansen Express are assumed not to compete with the airlines. For example, the Osaka to Sendai route entails an inconvenient stop and change of trains in Tokyo.

⁷ The reason why this dummy variable is separated from **DISLAND** is that the airplanes operating

mentioned offsetting factors will mask the net effect for DTR.

The estimated results for Model 1 are shown in Table-1.

Table-1 The regression results of Model 1 ($\ln(P_i/D_i)$ function)

Parameter	Intercept	DOKINAWA	DISLND	DEXP	DNARR	DTURBO	DYS	DTR
Parameter	5.310 (58.105)	-.100 (3.906)	-.060 (3.073)	-.105 (3.452)	.642 (5.406)	1.046 (6.196)		-.039 (1.255)
Parameter	$\ln(D)$	$\ln(D)$ *DOKINAWA	$\ln(D)$ *DISLAND	$\ln(D)$ *DEXP	$\ln(D)$ *DNARR	$\ln(D)$ *DTURBO	$\ln(D)$ *DYS	$\ln(D)$ *DTR
Parameter	-.180 (9.292)				-.129 (4.969)	-.170 (3.924)	-.051 (6.585)	

Note:

(1) Estimated by OLS. $\bar{R}^2 = .857$ SE = .094 N = 222

(2) "Backward stepwise method" is used for the choice of statistically significant variables. As a result, the regression statistics are a little improved comparing with the case in which all the dummy variables are introduced (see Table-12 in Appendix 1). This implies that the model above captures the nature of each variable more precisely than "full variables model". For example, the true nature of DYS is that it makes average cost curve slope down more steeply, with the intercept unchanged.

(3) t-statistics are in parentheses.

(4) Several routes are excluded from the data. Commuter routes are excluded due to the different pricing system used for these routes. The routes to and from Narita must be omitted because these routes are normally regarded as "international routes". All the passengers of these routes come and go from abroad by way of Narita airport. Finally, routes that are not in service throughout the year are not appropriate because the observations from these routes don't state the annual statistics.

(5) The data set used is composed of cross-sectional airfare and distance data points for domestic airline travel in Japan during 1995. The data sources are *Jikokuhyo*, (time table with tariff, monthly published by Japan Travel Bureau), 1995.10 and *Koku Yuso Tokei Nempo* (Data Summary for each air route, annually published), Ministry of Transport, 1996.

As expected, the parameter estimate for $\ln(D)$ (i.e., "i") is negative and the airfares of the Okinawa-bound and the isolated island-bound routes are lower than those in the other routes. In addition, Shinkansen Express (represented by DEXP) plays an important role as a competitor with the airlines, for it keeps the airfares lower. In the routes where narrow-bodied and turbo prop aircraft are operated, the airfares per distance for these routes will decrease more substantially than those for other routes as the distance is longer. As for the statistics, \bar{R}^2 is not overly large, even though this model introduces all the variables that reflect the cost difference. This means that there must exist other factors which affect the pricing practices of the industry. Each positive residual in this estimated function may be regarded as the extra mark-up charged for the corresponding routes, while each negative residual may be interpreted to represent an extra discount from the average cost levels.

between Okinawa islands are obviously smaller than those operating on "DTURBO routes".

In addition, another regression of $\ln(P_i/D_i)$ function is performed (hereafter, Model 2). To capture the relationship of density to cost, this model replaces various dummy variables in Model 1 with two continuous variables which also reflect airline costs. The econometric form of this model follows:

$$\ln(P/D) = a + b\ln(D) + c\ln(q) + d\ln(n) + \mu$$

where "q" is the number of passengers and "n" is the number of departures per year. The data set used to estimate Model 2 is the same as that used to estimate Model 1. The estimated results by OLS for Model 2 are as follows.

$$\ln(P/D) = 5.745 - .267 \ln(D) - .106 \ln(q) + 0.094 \ln(n)$$

(41.117)
(16.116)
(5.731)
(3.557)

$$\bar{R}^2 = .796 \quad SE = .112 \quad N = 222$$

Here we can observe evidence of the economies of density from the negative parameter estimate for $\ln(q)$. As with the regression for Model 1, the \bar{R}^2 is not very large. This low \bar{R}^2 implies that there likely exist some factors which drive airfares away from the average cost levels.

(2) The Classification of Domestic Routes

As is shown in section 2(1), the airfares per distance vary around the average cost. Thus as long as airlines can control the airfares, they may choose to charge them as functions of the factors of the market structure of each route such as the volume of demand (q), the price elasticity of demand, load factor (ϕ), and distance (D)⁸.

This part of section 2 classifies 222 Japanese domestic routes into three groups. Each group consists of the collection of similar routes in terms of q , ϕ , and D as established by the Ward method of cluster analysis⁹.

⁸ From the viewpoint of the traditional industrial organization theory, the number of competitors affects the mark-up of the price. However, even though there are more than two airlines, they charged the same price under the regulatory regime prior to May 1996 (namely, at the time when the data to be used in the following analysis was collected), so this case doesn't consider this factor.

⁹ The information of the price elasticity of each route is hard to obtain, so this factor is excluded from this cluster analysis.

Figure-1 shows the results for the cluster analysis (the tree of clusters), and Table-2 summarizes the character of each cluster within the set of the three largest clusters.

Figure-1 The result of cluster analysis

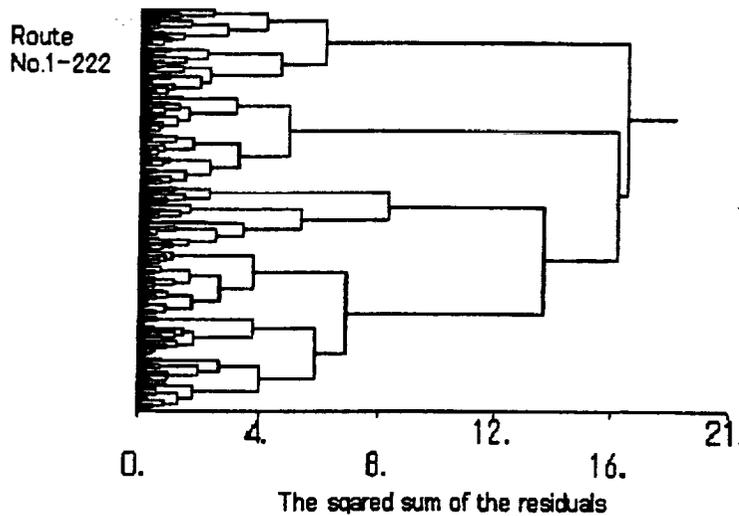


Table-2 The character of each cluster

	Average Number of Passengers (*1000)	Average Load Factor (%)	Average Distance (Km)	Total Number of Passengers (*1000)
1 st cluster (N=114)	99.1 (69.1)	56.6 (10.0)	989.4 (414.3)	11294.3
2 nd cluster (N=50)	1136.8 (1292.3)	60.5 (5.4)	861.1 (296.7)	56839.2
3 rd cluster (N=58)	148.0 (167.2)	63.2 (10.3)	276.3 (95.6)	8586.6

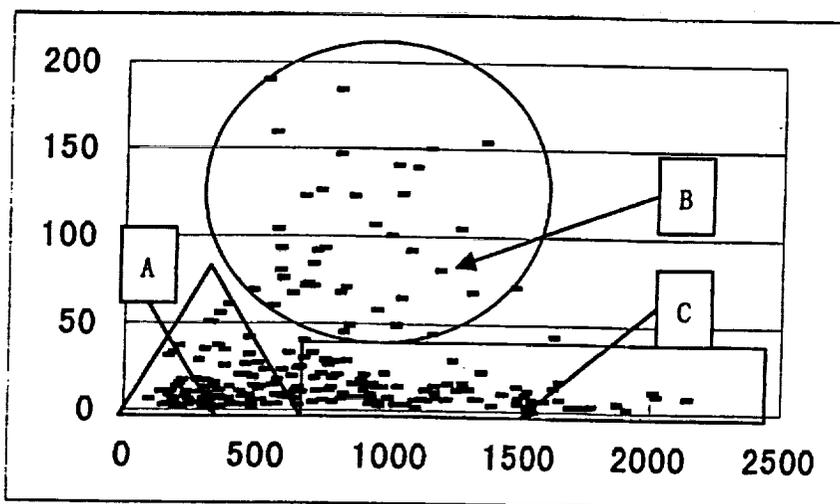
Note: Each cell shows the average value of each variable in 1995 and its standard deviation which is in parenthesis. The data source is *Koku Yuso Tokei Nempo*, Ministry of Transport, 1996.

Here it is worthwhile to explain why Japan's domestic routes may be classified into three groups and why cluster analysis is an appropriate method for determining these groupings. As a starting point, it is instructive to review the situation of the US airline markets before deregulation in 1978. In the US, it was very easy to distinguish one route's character from the other routes. For example, long haul routes were sure to have a large number of passengers (usually, big routes), while shorter-haul routes were relatively small. However, in Japan, there exist very complex geographical features for many routes (e.g., high mountains around the center of each island or the separation of origin and destination by water). As a result, it doesn't necessarily mean that short-

haul routes are small in passenger number. For example, although both Osaka-Miyazaki (567km) and Osaka-Oita (455km) are relatively short haul routes¹⁰, the number of passengers in 1995 were 806,000 and 475,000 respectively. Since air transportation has absolute advantage over railways in terms of both time and monetary cost¹¹, these routes do not necessarily compete with surface transportation modes even though one might intuitively expect them to due to their short distances.

Figure-2 visually illustrates the lack of correlation between the distance and the number of passengers in Japan's domestic airline routes.

Figure-2 The relationship between distance and the number of passengers



Note: the Y-axis represents the number of passengers in 1995 (*10000) and the X-axis represents the distance in kilometers (km). The routes for Tokyo-Sapporo (897km and 7.63 million passengers), Tokyo-Fukuoka (1035km and 6.19 million passengers), Tokyo-Okinawa (1692km and 2.45 million passengers), and Tokyo-Kagoshima (1104km and 2.12 million passengers) are excluded from the figure.

Generally speaking, it is appropriate to segregate Japan's domestic airline routes into three groups: "Type A (short haul & small)", "Type B (medium or long haul & big)", and "Type C (medium or long haul & small)". The cluster analysis in Figure-1 above derives very similar results

¹⁰ Osaka is in Honshu Island and both Miyazaki and Oita are in Kyushu Island.

¹¹ For example, if the passengers moving from the city center of Osaka to that of Miyazaki use air transportation instead of choosing the combination of railway express services, they can save not only 330 minutes but also about 13 US dollars (assuming that 1 \$US=100 Yen), even though we consider the access-time to both of the airports. In this case air transportation has the absolute

to the visual analysis in Figure-2. To illustrate this correspondence, Table-2 provides summary statistics for the three clusters. This table demonstrates that Type A corresponds closely to the 3rd cluster, Type B to the 2nd cluster, and Type C to the 1st cluster.

In the analysis that follows, the data will be analyzed as classified by the set of these three largest clusters. This level of aggregation has also been chosen to keep as many observations in each cluster as possible while still enabling appropriate within cluster comparisons.

As are repeated, the routes in the first cluster may be described as long haul, but thin in density and therefore not lucrative. These routes are characterized as "local to local" markets and note that many vacation routes which, for example, serve Okinawa, are included. Thus the price elasticity of this cluster is expected to be relatively larger than the price elasticity of the other clusters.

The second cluster contains long haul and by far the densest routes of all, despite the fact that the market size of each route varies widely. This cluster contains many business routes (e.g., Tokyo-Osaka and Tokyo-Fukuoka). Thus the price elasticity is expected to be relatively small on balance.

Finally, the third cluster contains thin, short haul, and relatively lucrative routes. Although many of the routes in this cluster are characterized as "short haul", many of them do not necessarily face competition with surface transportation modes due to the geographical complexities which were discussed above. Thus the price elasticity is expected to be small due to the lack of substitute transportation.

3 The Effect of the Revision of Current Airfares: Empirical Analysis

(1) The Procedure

Using the cross-sectional data introduced in section 2(1), the latter half of this section estimates the demand function of each cluster, and then derives the approximate changes of consumer's surplus if the art of charging domestic airfares is revised.

In advance of the empirical analysis, this part of the paper explains how the results of the preliminary analyses of the last section are associated with the empirical analyses. The factors

advantage over railway service.

necessary here are:

- (a) the demand elasticity of each cluster (the actual parameters are to be estimated in section 3(2) with results in Appendix 3),
- (b) the residuals obtained from estimating the $Ln(P_i/D_i)$ function,
- (c) the data of passengers and airfares.

It is convenient to complementarily use the designated definitions outlined below in Table-3 to simplify the explanation of the procedure in the subsequent analyses.

Table-3 The designated marks used in the procedure of the analysis

(A) the name of the group (cluster)	(B) the price elasticity of demand (absolute value)	(C) the sum of the residuals obtained from $Ln(P_i/D_i)$ function	(D) the total number of passengers	(E) the supposed conditions of each mark
α	ϵ_α	$SR_\alpha (> 0)$	q_α	$\epsilon_\alpha > \epsilon_\beta, q_\alpha > q_\beta$ $SR_\alpha + SR_\beta = 0$
β	ϵ_β	$SR_\beta (< 0)$	q_β	

For example, suppose that there are two groups (clusters) of routes, α and β (see column (A)), and that the absolute value of the estimated demand elasticity of the routes in cluster α and β are ϵ_α and ϵ_β respectively (column (B)). Also suppose that the sum of the residuals from the routes belonging to cluster α , SR_α , is positive (this means that the airfares of the routes in cluster α are set relatively higher than the distance-proportional levels), while SR_β is negative (See column (C)). Assume that the total number of passengers for each cluster are termed q_α and q_β , respectively (row (D)). The conditions shown in row (E) effectively require that the price elasticity of demand of α be larger than that of β , that total number of passengers carried of cluster α be larger than those of β , and that the sum of the residuals be zero. If these conditions are satisfied, then the potential gain in the consumer's surplus resulting from a one percent airfare reduction in cluster α is expected to surpass the loss of consumer's surplus that would occur in β as a result of a one percent airfare rise in that cluster.

Using the three different estimates for demand elasticity (one for each cluster stated in the last section) and the data of q_i and P_i , the next part of this paper predicts how much the consumer's surplus of each route would change by the revision of airfares to the distance-

proportional levels. Additionally, an estimate for how much the total amount of consumer's surplus of Japanese domestic air markets would change is derived by summing the amount of change in consumer's surplus for each route. As an intermediate step, it is necessary to define the levels at which the airfares should be set and by what percentage they should be changed. This paper assumes the case in which the current airfares are matched with the levels of the estimated curve of $Ln(P_i/D_i)$ in section 2(1), namely, the estimated average cost levels. The method of calculating its ratio is as follows:

$$CR_i = \frac{\mu_i}{Ln(P_i/D_i)}$$

where CR_i is the required ratio of change for the airfare of route i , and μ_i is the residual of route i in the $Ln(P_i/D_i)$ function¹². The method of charging airfares assumed here still guarantees that the airlines can earn profits greater than or equal to zero in the domestic operation, and may give the passengers the feelings of equality of pricing.

The demand function to be estimated in the following part is one of the three simultaneous equations. The others two simultaneous equations are the load factor and the fleet size function, respectively.

(2) The Simultaneous Equation Model and their Empirical Results

In this section, a simultaneous equation model will be constructed and then empirical analysis will be used to parameterize the model. The models to be constructed here explain the carriers' behavior under the condition where both airfares and frequency are regulated in the short run. Taking this regulatory regime into consideration, this paper chooses the passengers carried (q), the load factor (ϕ), and the fleet size (S) as the endogenous variables in the simultaneous equation model. The hat on top denotes these endogenous variables. Thus the model consists of three equations, and the process of deriving the theoretical model is shown in Appendix 2.

The econometric model is as follows. Since the airfares were not revised very often and were set according to the same accounting formulae throughout all the routes during the Old

¹² For example, CR of Tokyo-Osaka (Itami) is about .017, so in this case, it is predicted how the 1.7%'s discount of the fare will increase the consumer surplus of this route.

Regime, they are naturally assumed to be exogenous. The bar on the variable P is intended to denote that airfares are fixed. This means that all the equations are over-identified, but meet both order and rank condition. The variables and their explanations are shown in Table-4.

(1) Demand function

$$\text{Ln}(\hat{q}_i) = a_1 + b_1 \text{Ln}\left(\frac{\bar{P}_i}{D_i}\right) + c_1 \text{Ln}(INC_i) + d_1 \text{Ln}(POP_i) + e_1 \text{Ln}(n_i) + f_1 \text{Ln}(\hat{S}_i)$$

$$(b_1 < 0, c_1 > 0, d_1 > 0, e_1 > 0, f_1 > 0)$$

(2) Fleet size function

$$\text{Ln}(\hat{S}_i) = a_2 + b_2 \text{Ln}\left(\frac{\bar{P}_i}{D_i}\right) + c_2 \text{Ln}(n_i) + d_2 \text{Ln}(\hat{\phi}_i) \text{ (or } \text{Ln}(\hat{q}_i)\text{)}$$

$$(b_2 > 0, c_2 < 0, d_2 > 0)$$

(3) Load factor function

$$\text{Ln}(\hat{\phi}_i) = a_3 + b_3 \text{Ln}\left(\frac{\bar{P}_i}{D_i}\right) + c_3 \text{Ln}(HI_i) + d_3 \text{Ln}(n_i) + e_3 \text{Ln}(\hat{S}_i)$$

$$(b_3 < 0, c_3 > 0, d_3 > 0, e_3 > 0)$$

(Note: 1st cluster ($i = 1, \dots, 114$), 2nd cluster ($i = 1, \dots, 50$), and 3rd cluster ($i = 1, \dots, 58$))

Table-4 The explanation of the variables introduced in the simultaneous equation

Name	Source	Definition
q_i	(a)	The number of round-trip passengers carried in route i
\bar{P}_i	(b)	Normal round trip airfare of route i
D_i	(a)	Stage length of route i
POP_i	(c)	The square root of the product of the greater-area population of each origin and destination city served by route i
INC_i	(c)	The square root of the product of the disposable per-capita income of each origin and destination city served by route i
n_i	(a)	The number of the total departures in route i
S_i	(a)	The average number of seats for the aircraft operated in route i
ϕ_i	(a)	The average round-trip load factor of route i
HI_i	(a)	The Herfindhal index of each route i

Note: The data sources are: (a) *Koku Yuso Tokai Nempo*, Ministry of Transport, 1996 (b) *Jikokuhyo*, Japan Travel Bureau, March 1996, (c) *Chiiki Keizai Soran* (the data summary for urban and regional statistics), Toyo Keizai Shimposha, 1996.

In the demand function, n and S represent the service quality variables. The more the flight frequency increases for a given route, the more opportunity the passengers will have to choose the flight times that they prefer. This will cause the frequency delay to decrease¹³. In addition, S is expected to play the same role as n in the demand function for the same reason.

The fleet size function explains the carriers' behavior of organizing their fleet in order to optimize the efficiency. Here, P/D , n , and q are expected to affect a carrier's choice of which aircraft to operate in a given route. The load factor, according to Douglas and Miller (1974)¹⁴, shows how the quality competition affects the demand and supply balance. The parameters for the load factor and fleet size functions were also estimated and their results are shown in Table-14 and Table-15 respectively, in Appendix 4.

Part 1

4 A Welfare Analysis of Japan's Domestic Airline Markets

The summary of the price elasticity of demand of each cluster as well as the sum of the residuals of $\ln(P_i/D_i)$ function is shown in Table-5. The two stage least squares (2SLS) regression results of each demand function are shown in Table-13 in the Appendix 3.

Table-5 The price elasticity of each cluster

	1 st cluster	2 nd cluster	3 rd cluster
The sum of the residuals of each cluster (Model 1)	.1546	-.2183	.0637
Price Elasticity of demand (ϵ_j)	-.8017	-.5409	-.5727

Similar to the case of the US airline industry prior to deregulation, the airfares of longer haul routes in Japan (i.e., the routes in the 1st cluster) have been set higher than airfares for shorter haul routes. This is shown in the analysis by the fact that the sum of the residuals of the 1st cluster is substantially positive. In addition, since many popular tourist routes are included in the 1st cluster, the absolute value of the price elasticity of demand of this cluster is relatively larger than those of the other clusters. As a result, the consumer's surplus is expected, on average, to be substantially

¹³ See Douglas and Miller (1974a), pp.82-83, (1974b), pp.658-659, and Panzar (1979), pp.92-95.

ameliorated by changing the current airfare of the 1st cluster to the levels of estimated average cost of each route.

On the other hand, the sum of the residuals of the 2nd cluster is negative. The routes in this cluster are much larger than the routes in the others clusters, on average. Thus, the revision of airfares might lead to a substantial reduction of consumer's surplus for this cluster, even though the price elasticity for this cluster is the smallest of all¹⁵. However, twenty one of the fifty routes in the 2nd cluster have positive residuals, and many of them are large routes such as Tokyo-Sapporo or Tokyo-Fukuoka, it is not necessarily determined whether or not the revision of airfares would reduce the consumer's surplus of this cluster. These results reveal the opacity and inconsistency of the charging system of airfares under the current regulatory regime. For some routes, the observed airfares are often set higher or lower than would be predicted by the models presented in this paper. This occurs despite the fact that the price elasticity of demand is the same for all routes within the cluster and the number of passengers, distance, and the load factor don't differ significantly within the cluster.

The price elasticity of demand for the routes in the 3rd cluster is as small as that of the 2nd cluster, and the sum of residuals in the 3rd cluster is barely positive. This means that the revision of airfares in this cluster may not have much influence on the change in the consumer's surplus.

The change in the consumer's surplus for each route (CCS_i) may be derived using Marshallian manner of calculation:

$$CCS_i = CR_i * \bar{P}_i * q_i \left(1 - \frac{1}{2} CR_i * \varepsilon_j \right) (i = 1, 2, \dots, 222, j = 1, 2, 3)$$

Then the total change of consumer's surplus ($TCCS$) may be described as:

$$TCCS = \sum_{i=1}^{222} CCS_i$$

Table-6 lists the top twenty routes ordered by CCS_i , where the CCS_i would increase as a result of a revision of airfares to their predicted levels.

¹⁴ Douglas and Miller (1974a), pp.50-54, and (1974b), pp.660-663.

¹⁵ Many large business routes (e.g., Tokyo-Sapporo, Tokyo-Osaka, Tokyo-Fukuoka, etc.) are included in the 2nd cluster. This fact may cause the smaller price elasticity of demand for this cluster.

The most interesting feature of Table-6 is that seventeen of the twenty routes belong to the 2nd cluster. This means that each airline exploits the consumer's surplus of long haul and dense routes, deriving its highest margin from these routes. In addition, Table-7 shows the change in consumer's surplus in each cluster and *TCCS*.

Table-6 The list of top 20 routes for which the *CCS*, would increase as a result of a revision in airfares

Route		Normal round trip airfare (\$US, 1995)	Expected fare change (\$US)	The expected increase of <i>CCS</i> , (\$US*1000)	Cluster No.
TOKYO	FUKUOKA	458.0	-3.76 (-3.53)	23287.67 (21848.49)	2
TOKYO	HIROSHIMA	390.6	-5.70 (-3.94)	9787.84 (6752.75)	2
TOKYO	ITAMI	265.0	-4.43 (-0.88)	9446.01 (1876.53)	2
TOKYO	SAPPORO	431.0	-0.99 (-6.15)	7531.36 (47108.58)	2
FUKUOKA	MIYAZAKI	227.6	-11.79 (-5.30)	7302.31 (3249.92)	3
NAGOYA	SAPPORO	515.6	-6.36 (-10.33)	7022.30 (11423.64)	2
TOKYO	AOMORI	387.0	-8.91 (-10.52)	6321.99 (7472.00)	2
TOKYO	OKAYAMA	382.4	-13.35 (-5.45)	5199.41 (2112.43)	2
TOKYO	TAKAMATSU	384.2	-4.87 (-7.12)	4746.22 (6955.79)	2
TOKYO	TOKUSHIMA	380.6	-5.55 (-6.40)	3846.66 (4441.21)	2
TOKYO	MISAWA	384.2	-9.53 (-8.53)	3586.74 (3205.33)	2
TOKYO	KUSHIRO	528.2	-7.35 (-11.32)	3538.84 (5461.71)	2
ITAMI	SENDAI	423.0	-5.15 (-6.58)	3527.98 (4506.71)	2
KANSAI	OKINAWA	526.0	-4.05 (+0.47)	3335.43 (-384.40)	2
ITAMI	SAPPORO	573.0	-8.92 (-11.71)	3113.12 (4089.58)	2
KAGOSHIMA	FUKUOKA	227.6	-4.87 (-6.22)	3080.83 (3940.68)	3
TOKYO	TOTTORI	388.8	-10.58 (-9.62)	2897.72 (2632.44)	1
FUKUOKA	SAPPORO	721.0	-5.47 (-18.18)	2432.77 (8126.84)	2
TOKYO	ASAHIKAWA	522.0	-3.27 (-8.00)	2367.83 (5805.82)	2
TOKYO	OBIHIRO	510.2	-5.19 (-9.14)	2055.70 (3627.03)	2

Note:

- (1) In order to assist both the Japanese and others readers in understanding these figures more easily, the consumer surplus values have been presented in US dollars assuming that 1 US dollar is equivalent to 100 Yen.
- (2) The values are calculated by using the estimated results of Model 1. (The values in parentheses are derived from Model 2).

Table-7 The change in consumers surplus in each cluster and *TCCS* (US dollars, *1000)

1 st cluster	2 nd cluster	3 rd cluster	<i>TCCS</i>
3324.49	4606.14	-976.84	6953.79

Note: 1 US dollar = 100 Yen. These values are calculated by using the estimated result of Model 1.

In general, if the airfares are revised to the levels predicted by Model 1, the consumer's surplus of the 3rd cluster may decrease, but this decrease may be offset by the increase of the

consumer's surpluses of the 1st and 2nd cluster. On balance, the *TCCS* is expected to increase by more than 6.95 million US dollars. If the airfares are revised to the levels predicted by Model 2, the *TCCS* may increase by about 150 million US dollars, on balance¹⁶.

However, it appears as though the new regulatory policy, initiated in May 1996, governing fare-charging practices of the domestic airlines has not necessarily improved the shortfall in consumer's surplus. For instance, airfares for routes in the 2nd cluster type were primarily increased except for the local routes that serve the points in Hokkaido and Okinawa where airfares were lowered. Although each airline was permitted, by new regulation, to discount airfares by a maximum of 25% off the prevailing airfares, the airfares were actually raised in those routes where the residual in $Ln(P_i/D_i)$ function is positive¹⁷. This policy change may have reduced consumer's surplus for those consumers who typically paid the normal airfares prior to regulatory change. This contrasts with the consumer's impression that the surplus would universally improve following the regulatory changes of 1996¹⁸.

¹⁶ As the statistics for the regression of Model 2 is less fitted than that of Model 1, it is natural that the change in consumer's surplus derived from Model 2 be greater than that which is derived from Model 1.

¹⁷ Speaking of the trunk routes except for those which serve Narita, six of thirteen routes (Tokyo-Sapporo, Tokyo-Osaka (Itami and Kansai), Tokyo-Fukuoka, and Osaka-Fukuoka) experienced a rise in fares of 5.56%, while the other routes (Tokyo-Okinawa, Osaka-Sapporo, Osaka-Okinawa, Fukuoka-Sapporo, Fukuoka-Okinawa) benefited from the revision of air fares (the reduction ratio is 2.55%). Generally speaking, the long distance routes that serve Okinawa and Hokkaido (except for Sapporo) experienced a reduction in airfares. However, it is apparent that the revision in airfares has been orchestrated primarily to benefit the airlines, not the consumer. This is evidenced by the fact the change in regulation was followed by an increase in the fares for "already lucrative" routes. For example, the correlation coefficient between the residuals in $Ln(P_i/D_i)$ function and the rising percentage of the fares after the policy change in 1996 is $r = .3615$ ($t=6.710$, $N=222$). This implies that the airline can generate greater profits under the new regime.

¹⁸ However, since discount ticket fares for advanced purchase and frequent flyer programs have become more and more readily available compared with the era prior to 1996, the well-informed consumers have increasingly come to capitalize on the opportunity to benefit from the purchase of discounted tickets. In order to more precisely analyze the issue of the change in consumer's surplus

5 Concluding Remarks for Part 1

The analyses of this paper reveal the character of the charging system of Japanese domestic airfares and assess the effect of the revision of the current airfares on the consumer's surplus.

Under the past and the current regulatory regime, the charging system used by carriers to set airfares has not been clear, particularly for airfares set in dense long haul routes. As well, it is not obvious why higher airfares were observed in many thin long haul routes. Speaking of dense long haul routes, it doesn't follow that changing the airfares to the distance-proportional levels would diminish the consumer's surplus in the 1st cluster because the sum of the residuals is positive. The airfares of such outstandingly large routes as Tokyo-Sapporo, Tokyo-Fukuoka, and Tokyo-Osaka, the three biggest routes in Japan, are charged higher than the average. Airfare reduction for these routes might significantly increase the consumer's surplus for this 1st cluster.

As the airfares of thin long haul routes are also higher and the price elasticity of demand is relatively larger in these routes, the airfare reduction in these routes might lead to the amelioration of consumer's surplus. On the other hand, the airfares of shorter haul routes are set lower on average, so the change of airfares to the distance-proportional levels would reduce the consumer's surplus for these types of routes. However, both the absolute value of the price elasticity of demand and the number of passengers travelling these routes are so small that the reduction in consumer's surplus is expected to be very subtle. In total, the potential increase in consumer's surplus is large. The consumer surplus increase in dense routes would offset the welfare loss that might arise in shorter and thin routes. This empirical analyses suggest that the total gain in consumer surplus would be more than 6.95 million US dollars (for Model 1) or 150 million US dollars (for Model 2) per year.

Judging by the empirical results, the domestic airfare regulatory policy managed by the Japanese Ministry of Transport prior to 1996 has been favorable for the industry in that it guaranteed the airlines positive profits. However, this regulatory regime has not necessarily been optimal for consumers in that there likely existed opportunities for an improvement in the consumer's surplus. To make the matter worse, the consumer's surplus may have decreased all the more under the revised regime in 1996, because many of the normal airfares of long haul dense routes were raised

following the aforementioned policy change, it is a necessary to give proper consideration to the

and airlines have sought to exploit more profits from long and dense routes. As stated in section 1, the most significant change in this minor policy revision was that Ministry of Transport allowed each airline to freely choose to set the airfares within a 25% range below maximum airfares. Regrettably, this has not had any meaningful impact because the airlines (especially JAL and ANA) have succeeded in raising the airfares in an "across the board" way in those routes where the competition is supposed to take place, namely, in double and triple track routes¹⁹. Indeed, this negative welfare effect on consumer's surplus may have to be discounted to some extent, because the availability of discount tickets has been expanded. Examples of these include the "advanced purchase (maximum 35-36% off in 1996 and 50% off in 1998)" ticket that has the restrictions similar to those on US discount tickets²⁰ and the "domestic frequent flyer program" that has the meaning equivalent to the discount ticket. The problem regulatory regime might be less significant than this paper predicts as long as consumers find these discount tickets readily accessible. More specifically, this would require that the Japanese experience mirror, to some extent, the case of the deregulation in the US. In this US case, an increasing number of passengers came to purchase varieties of discount tickets, although the inflation-adjusted normal airfare levels increased more than the pre-deregulation levels. However, the availability of discount tickets in Japan is still limited in that the discounts, in percentages, are much smaller than those for the comparable airfares in the US²¹. There still remains substantial room for the Japanese government to improve the consumer's benefit without worsening, and possibly even improving, the status quo of the airlines.

Part 2

ratio of discount ticket using passengers to total passengers.

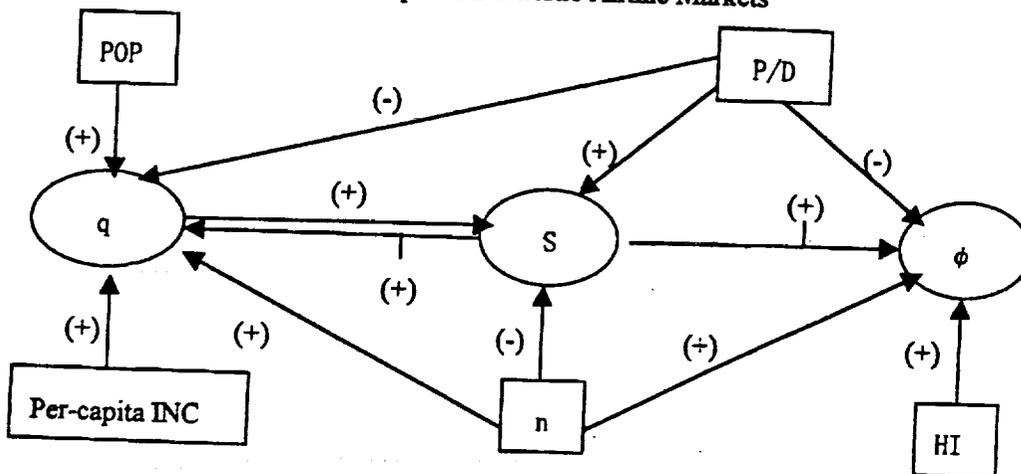
¹⁹ However, it is interesting that the JAS has not necessarily followed the pricing strategy of JAL or ANA. For example, JAS set the fare of Tokyo-Sapporo at 24050 yen, which is cheaper than those of JAL and ANA by 200 yen. The reason why JAS did so is that it has to compensate for the disadvantage of departure time and the number of frequency. Although the difference of fare may be too small to attract consumers, this behavior is expected to promote the competition among airlines.

²⁰ See Yamauchi and Ito, *op.cit.*, p.41.

²¹ See Morrison and Winston (1995), pp.11-19.

This section focuses on the analysis of the rest two equation developed in Section 3. As is shown in section 3(2), the behavior of choosing optimal airplane size (that is, supply behavior) is explained by distance-controlled price, flight frequency, and market demand. In addition, load factor is determined by distance-controlled price, fleet size, flight frequency, and market concentration. To help the readers understand this complex system more easily, this section uses the following diagram for the analyses in this section.

Figure-3 The Mechanism of Japan's Domestic Airline Markets



In this diagram, the variables in ovals stand for endogenous variables while those in rectangles are exogenous variables. In the fleet size function, the effect of flight frequency (n) on fleet size (S) and the effect of distance-controlled price (P/D) on flight frequency can be decomposed into two flows. As for the relationship between fleet size and flight frequency, these two flows can be explained as follows:

- (1) The increase of flight frequency will cause the increase of the number of passengers (q) because the increase of flight frequency implies the improvement of service quality. It is natural that fleet size expands as the number of passengers increases. This flow is the indirect effect of flight frequency on fleet size.
- (2) Airlines always try to reduce the number of empty seats. As flight frequency increases, the number of empty seats could also increase. In this case, airline likely adjust the fleet size to prevent the total number of seats from being excess. This process is regarded as the direct effect of flight frequency on fleet size.

In addition, the two flows from distance-controlled airfare to fleet size are explained as

of flight frequency on fleet size.

In addition, the two flows from distance-controlled airfare to fleet size are explained as follows:

- (1) One flow starts with distance-controlled airfare, passes the number of passengers, and reaches fleet size. Of course, the effect of airfare on the number of passengers is negative. In addition, airlines likely expands the fleet size as the number of passengers increase. Combining these two effects, distance-controlled airfare may have indirect negative effect on fleet size.
- (2) Another flow is the normal relationship between output and airfare in supply function. This flow is the direct effect of airfare on fleet size.

Distance-controlled airfare and frequency have also indirect and direct effects on load factor. Load factor is one of the indices that represents the airline's performance. In order to improve the performance, airlines may lower the distance-controlled airfare in such a specific situation as the load factor always remains low. This behavior may be more likely performed in more liberalized markets taking a form of, for example, yield management. If we call this behavior the direct effect of airfare on load factor, we can find another flow that has indirect effect on load factor. This indirect effect comes via the effect of distance-controlled airfare on fleet size. The expansion of fleet size can have the meaning of the improvement of service quality. Therefore, the relationship between fleet size and load factor can be positive. Since the total effect of distance-controlled airfare on fleet size is cannot be specified a priori, the effect of distance-controlled airfare on load factor is also the empirical issue.

Similar to the effect of distance-controlled airfare on load factor, the effect of flight frequency is also decomposed into three flows. One is the direct effect, another indirectly comes via fleet size, and the other also indirectly comes via the number of passenger and fleet size. Like the expansion of fleet size, the increase of flight frequency implies the upgrade of service, so the direct effect of flight frequency on load factor may be positive. On the other hand, two indirect flows from flight frequency to load factor contains both positive and negative effects, the total effect of flight frequency can only be revealed through empirical analysis.

The supply behavior is expected to vary among large and small markets because wide-bodied aircraft is not compatibly used in small markets. For example, B747 type airplane serves only in those large markets which has more than one million passengers per year. Therefore, the empirical analyses in this section are performed for each cluster defined in Section 2(2).

This section only shows the diagrams of Japan's domestic market systems. Statistically insignificant effects are all omitted from the diagrams. The empirical statistics are shown in Appendix 4.

Figure-4 The Market Mechanism of Cluster 1

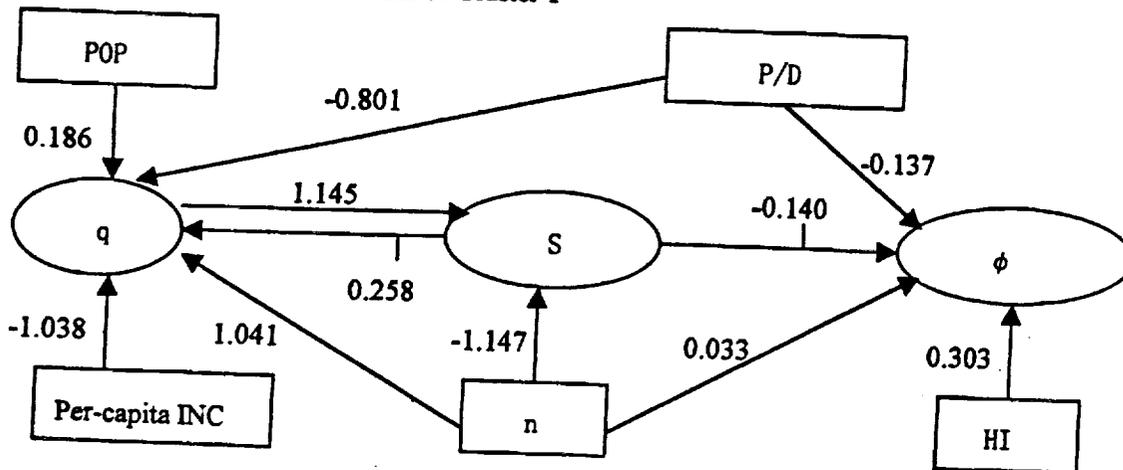
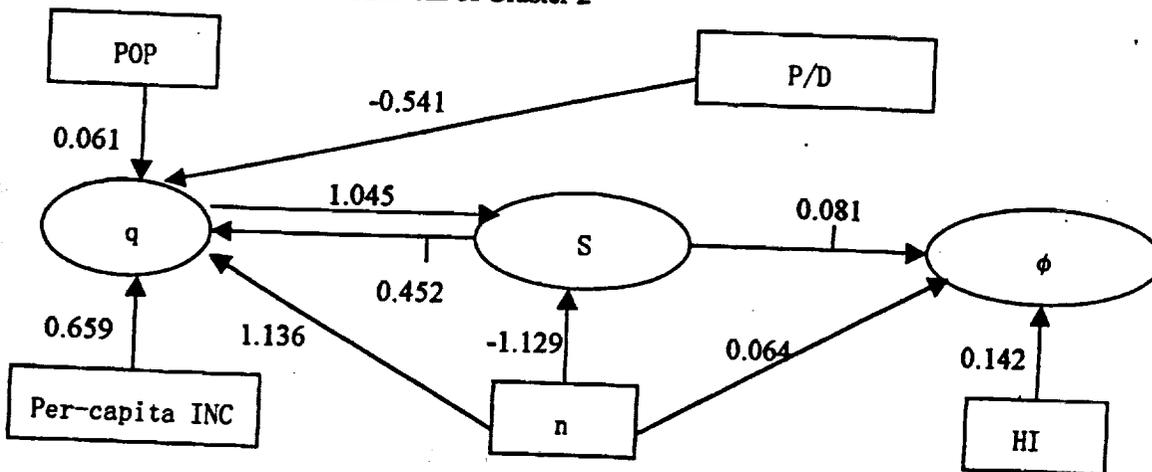


Figure-5 The Market Mechanism of Cluster 2



The total effects of flight frequency on fleet size is shown in Table-8.

Table-8 The total effects of flight frequency on fleet size

	Indirect effect	Direct effect	Total effect
1 st cluster	$1.041 \times 1.145 = 1.191$	-1.147	0.045
2 nd cluster	$1.136 \times 1.045 = 1.187$	-1.129	0.058
3 rd cluster	$1.140 \times 1.126 = 1.284$	-1.245	0.039

All the signs of coefficients are the same as the model expects, and as a result the total effects of flight frequency on fleet size is weakly positive. This result implies that the indirect effect (flight frequency \uparrow \rightarrow the number of passengers \uparrow \rightarrow fleet size \uparrow) is stronger than the direct effect.

The effects of distance-controlled airfare on fleet size are summarized in Table-9. In the large and medium markets, the normal relationship between airfare and output for supply function is not recognized. Eventually, the total effects are all negative, despite the fact that the elasticity varies among the route types.

Figure-6 The Market Mechanism of Cluster 3

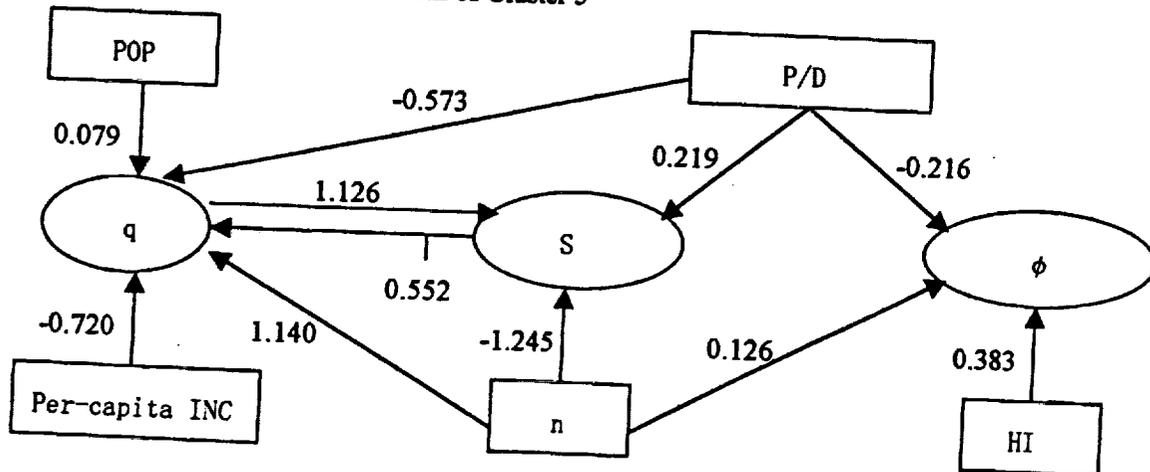


Table-9 The total effects of distance-controlled airfare on fleet size

	Indirect effect	Direct effect	Total effect
1 st cluster	$-.801 \times 1.145 = -.917$	Not significant	-.917
2 nd cluster	$-.541 \times 1.045 = -.565$	Not significant	-.565
3 rd cluster	$-.573 \times 1.126 = -.645$	.219	-.426

The total effects of flight frequency on load factor are shown in Table-10.

Table-10 The total effects of flight frequency on load factor

	Indirect effect (1)	Indirect effect (2)	Direct effect	Total effect
1 st cluster	$1.041 \times 1.145 \times (-.140) = .167$	$-1.147 \times (-.140) = .161$	.033	.027
2 nd cluster	$1.136 \times 1.045 \times 0.081 = .096$	$-1.129 \times .081 = -.091$	.064	.069
3 rd cluster	Not Significant	Not significant	.126	.126

In this case, there are two flows for indirect effects. One comes from flight frequency via the number of passengers and fleet size, and the other comes from only via flight frequency.

However, these two indirect effects offset each other for large and medium markets, and neither of the indirect effects are significant for small markets. As a result, only direct effects of flight frequency work on load factor, and the sign of coefficients are the same as the model anticipates. This results imply that there exists the possibility that airlines have good incentives to request the governments to increase the number of their own departure especially for small markets, and this also implies that the capacity could be excessive.

Finally, the total effects of distance-controlled airfares on load factor are shown in Table-11.

Table-11 The total effects of distance-controlled airfares on load factor

	Indirect effect (1)	Indirect effect (2)	Direct effect	Total effect
1 st cluster	$-.801 * 1.145 * (-.140) = -.167$	Not significant	-.137	-.009
2 nd cluster	$-.541 * 1.045 * 0.081 = -.046$	Not significant	Not significant	-.046
3 rd cluster	Not significant	Not significant	-.216	-.216

In this case the indirect effects are also divided into two flows, but one of them (the flow from airfare to load factor via fleet size) is insignificant for all the clusters. For cluster 1, both indirect and direct effects works on load factor, but these two effects offset each other, and as a result the total effect becomes very close to zero. This fact may imply that airlines have at least the incentive to improve the load factor by lowering airfares for long haul and thin markets, but they may feel that this effort is not worthwhile because it is offset by the indirect effect. As a result, airlines may abandon the incentive to lower the airfares for this kind of markets when the domestic markets are deregulated in future.

For cluster 2, only an indirect effect works on load factor. This fact may imply that airlines will not improve the load factor at least by adjusting the airfares for large markets. On the other hand, airline may have incentives to improve the load factor by lowering airfares for short haul markets.

Here is the evidence that support the facts found in the estimated load factor function. After the minor regulatory change in 1996, airlines have been allowed to set the airfares 25% off the full fares. However, airlines raised the airfares by 117.38 yen on average for the routes that belong to the cluster 1. The airfares of other routes were also raised, but much smaller increases were observed for the rest two clusters on average.

7 Concluding Remarks for Part 2

In summary, the estimated results for the fleet size function and the load factor suggest the following implications for more liberalized domestic airline markets.

- (3) Only in the short haul markets the decrease of airfares (controlled by distance) tends to cause a higher load factor. This result implies that there are incentives for airlines to do yield management by lowering the airfares, once airfares are deregulated. On the other hand, in the groups of long haul routes, airlines don't have this kind of incentive. This is supported by the fact that there were very few cases of discounting airfares especially in long haul and thin markets following the minor regulatory revision in June 1996.
- (4) Flight frequency, together with Herfindahl index, has the positive effect on load factor. This is similar to the US case prior to deregulation (See Douglas & Millar (1974b)). This implies that there exists the possibility that airlines will request the governments to excessively increase the number of their own departure especially for small markets as the capacity of domestic markets is enlarged or the domestic markets are more deregulated.

Appendix 1

Table-12 The regression results of Model 1 (full variable model)

Parameter	Intercept	DOKINAWA	DISLND	DEXP	DNARR	DTURBO	DYS	DTR
	5.374 (40.585)	.008 (.017)	-.088 (.774)	-.231 (.399)	.585 (3.840)	1.007 (4.711)	-.097 (.451)	-.212 (.485)
Parameter	$Ln(D)$	$Ln(D)^*$ DOKINAWA	$Ln(D)^*$ *DISLAND	$Ln(D)^*$ *DEXP	$Ln(D)^*$ *DNARR	$Ln(D)^*$ *DTURBO	$Ln(D)^*$ *DYS	$Ln(D)^*$ *DTR
	-.194 (6.884)	-.021 (.237)	.008 (.283)	.033 (.259)	-.115 (3.537)	-.163 (3.088)	.074 (1.395)	.036 (.405)

Note: Estimated by OLS. $\bar{R}^2 = .855$ $SE = .095$ $N = 222$

Appendix 2

This paper assumes that the number of passengers, fleet size, and load factor are determined by the profit-maximizing behavior of the airlines. The definitions for all the variables are shown in Table-3.

The profit function is written as follows.

$$\pi_i = \bar{P}_i q_i - c(n_i S_i D_i) = \bar{P}_i q_i - c \left(\frac{q_i}{\phi_i(q_i)} \right) D_i$$

where c is a constant and represents the cost per unit distance. An airline's cost is supposed to reflect the losses which arise from carrying empty seats. The load factor ϕ_i is a function of q_i . This is derived by the manipulation of the common definition $q_i = \phi_i n_i S_i$. Thus, $\frac{\partial \phi_i}{\partial q_i} > 0$.

The first order condition with regard to q_i yields

$$\bar{P}_i - c \left(\frac{1}{\phi_i(q_i)} \right) D_i + c \left(\frac{q_i}{\phi_i^2(q_i)} \right) D_i = 0$$

Dividing all the terms by n_i yields

$$\begin{aligned} \frac{\bar{P}_i}{n_i} - \frac{cD_i}{n_i \phi_i(q_i)} + \frac{cq_i D_i}{n_i \phi_i^2(q_i)} \\ = \frac{\bar{P}}{n_i} - \frac{cD_i}{n_i \phi_i(q_i)} + \frac{cD_i S_i}{\phi_i(q_i)} = 0 \quad \left(\because S_i = \frac{q_i}{n_i \phi_i} \right) \end{aligned}$$

Manipulating this yields

$$S_i = \frac{1}{n_i} \left(1 - \frac{\bar{P}_i \phi_i(q_i)}{cD_i} \right) \quad (1)$$

and

$$\phi_i = \frac{c}{(\bar{P}_i/D_i)} (1 - n_i S_i) \quad (2)$$

Here c should be equal to zero or negative around the neighborhood of zero, because in equation (2) it is obvious that $0 \leq \phi \leq 1$ with $n_i S_i \gg 0$ and $\bar{P}_i/D_i > 0$.

Then this condition can be applied to the marginal cost (MC) function. MC function is written as

$$\frac{\partial TC_i}{\partial q_i} = MC_i = \frac{cD_i}{\phi_i} \left(1 - \frac{q_i}{\phi_i} \right)$$

and since $\frac{D_i}{\phi_i} > 0$, and $\frac{q_i}{\phi_i} > 0$, the condition that c is negative around the neighborhood of zero

implies weakly decreasing return to scale. When $c=0$, obviously $MC=0$.

Adding a Marshallian demand function to equations (1) and (2) yields the following simultaneous equation system that consists of three equations.

$$(a) \text{ Demand function } q_i = q \left[(-) \frac{\bar{P}_i}{D_i}, (+) INC_i, (+) POP_i, (+) v_i \right]$$

where v_i denotes the service vector.

$$(b) \text{ Fleet size function } S_i = s \left[(+) \frac{\bar{P}_i}{D_i}, (-) n_i, (+) \phi_i \right]$$

The sign of each parameter is derived by assuming that $c < 0$.

$$\frac{\partial S_i}{\partial (\bar{P}_i/D_i)} > 0, \quad \frac{\partial S_i}{\partial n_i} < 0, \quad \frac{\partial S_i}{\partial \phi_i(q_i)} > 0$$

Since the fleet size function is regarded as an alternative form of the supply function, the sign of \bar{P}_i/D_i is positive.

(c) Load factor function

$$\phi_i(q_i) = \phi \left[(-) \frac{\bar{P}_i}{D_i}, (+) HI_i, (+) n_i, (+) S_i(q_i) \right]$$

Here we assume that ϕ_i is an indirect function of q_i . HI_i is the concentration ratio, a variable of market structure, which affects the airline's performance according to the traditional theory of industrial organization. The sign of this variable is assumed to be positive, following the empirical results of Douglas & Miller (1974b). The signs of the other variables are derived under the condition that $c < 0$.

$$\frac{\partial \phi_i}{\partial (\bar{P}_i/D_i)} < 0, \quad \frac{\partial \phi_i}{\partial n_i} > 0, \quad \frac{\partial \phi_i}{\partial S_i(q_i)} > 0$$

Appendix 3

Table-13 The regression results of the demand function

	1 st cluster	2 nd cluster	3 rd cluster
Intercept	5.7907 (14.1510)	-3.8521 (86.8399)	2.1142 (2.4057)
$Ln(P/D)$	-.8017 (22.4513)	-.5409 (110.3277)	-.5727 (8.0928)
$Ln(POP)$	.1855 (20.3286)	.0612 (48.0536)	.0790 (5.6146)
$Ln(INC)$	-1.0388 (23.3854)	.6586 (75.1975)	-.7204 (6.3031)
$Ln(n)$	1.0408 (280.2741)	1.1360 (1266.0292)	1.1396 (114.0907)
$Ln(S)$	.2578 (8.8966)	.4520 (140.8809)	.5516 (9.2450)
\bar{R}^2	.9991	1.000	.9981
SE	.0200	.0026	.0462
N	114	50	58

Note: Estimated by 2SLS, and t-statistics are in parenthesis.

Since air transportation service is unlikely to be the inferior good, it is necessary to explain why the parameters of $Ln(INC)$ of the first and the third cluster are negative. The reasons are:

- (1) in the first cluster, the airline has absolute advantage over any other surface transportation mode: the average distance of the first cluster is so long that the surface transportation modes are more costly than air transportation in terms of money and time. Therefore, passengers inevitably choose the air transportation even though their per-capita income levels are relatively lower.
- (2) the third cluster includes the routes between isolated islands, and the routes which cross over mountainous area (if passengers use surface transportation modes, the time cost and sometimes even the monetary cost may be higher than the cost for using the air transportation). Thus passengers inevitably use air transportation, despite the fact that the average per-capita income levels of this cluster are relatively lower.

In summary, passengers have few alternative transportation modes for airlines and thus this prevents passengers from shifting to another transportation mode. Additionally, the fares for surface transportation modes are also regulated and sometimes set so high, or the service for these alternative transportation modes are so inconvenient (that is, very infrequent or too time consuming).

that passengers don't feel these surface transportation alternatives are worth shifting to the airlines. These seem to cause the estimated results for the parameters of per capita income, i.e., passengers choose airlines regardless of their per-capita income.

Appendix 4

Table-14 The regression results of the fleet size function

	1 st cluster	2 nd cluster	3 rd cluster
Intercept	4.7612 (19.8331)	5.2155 (8.5066)	4.3733 (13.7324)
$\ln(\bar{p}_i/D_i)$	.0636 (1.0518)	.0292 (.2034)	.2186 (2.8536)
$\ln(n_i)$	-1.1476 (28.2189)	-1.1291 (12.7402)	-1.2452 (22.9755)
$\ln(\hat{q}_i)$	1.1454 (31.3053)	.0355 (15.2552)	1.1261 (25.8529)
\bar{R}^2	.9618	.9091	.9723
SE	.0594	.0781	0.713
N	114	50	58

Note: Estimated by 2SLS, and t-statistics are in parenthesis.

Table-15 The regression results of the load factor function

	1 st cluster	2 nd cluster	3 rd cluster
Intercept	4.2372 (44.8839)	3.4607 (13.5176)	3.4332 (10.0295)
$\ln(\bar{p}_i/D_i)$	-.1366 (12.8530)	-.0392 (1.0693)	-.2159 (6.8820)
$\ln(HI_i)$	.3032 (33.4070)	.1421 (10.8823)	.3826 (9.9427)
$\ln(n_i)$	.0333 (17.3855)	.0644 (8.9170)	.1259 (21.3979)
$\ln(\hat{S}_i)$	-.1400 (24.0583)	.0807 (4.0813)	-.0151 (.8144)
\bar{R}^2	.9663	.7561	.9205
SE	.0105	.0021	.0300
N	114	50	58

Note: Estimated by 2SLS, and t-statistics are in parenthesis.

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**A TALE OF TWO AIRLINES:
THE POST PRIVATISATION PERFORMANCE
OF TWO CARIBBEAN AIRLINES**

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Under severe fiscal pressure and in the wake of continuing poor performance of their airlines, the governments of Jamaica and Trinidad and Tobago were forced to privatise their flag carrier. Privatisation was expected to lead to much improved performance in an increasingly competitive environment. Three years after privatisation and despite the governments taking over all of the airlines' debt, the two privatised airlines have once more accumulated huge losses, with one airline almost on the verge of bankruptcy. This paper takes a comparative look at the post-privatisation performance of both airlines. The paper examines the strategies adopted by these privatised airlines in the face of intense competition from their much larger rivals. Finally the paper considers whether small, unsupported airlines can survive in the new competitive environment.

PRIVATISATION: A PANACEA?

The competitive forces unleashed by the United States (US) deregulation of its domestic industry in 1978, and the US attempt to export its liberal philosophy to the rest of the world have drastically altered the face of the international airline industry. The moves to create a more liberal international airline industry, and the attendant developments in the operating environment (mergers and alliances, route re-configuration, development of computer reservation systems (CRSs), frequent flyers programmes, etc.) have generated upheavals in the industry. This

I wish to acknowledge the assistance received from Mr C. Zacca, Chief Operating Officer and Mr T Hill, General Manager of Eastern Caribbean Operations of Air Jamaica

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is largely the result of airlines around the world attempting to align their corporate strategies with the new operating environment in a bid to ensure their survival.

One dimension of the restructuring that is taking place is the substitution of private ownership for state ownership. A wave of privatisation has swept an industry once dominated by state-owned firms. On the surface, it appears as if privatisation is being pursued as a panacea for problems plaguing the industry, irrespective of the peculiar circumstances of individual airlines. Airlines from Africa, Asia, Eastern Europe, Western Europe, Latin America and the Caribbean have been privatised, all with the expectation that this would launch these airlines on a more profitable path that would ensure their long run survival and provide the respective countries with a reliable and efficient air transportation network. Privatisation is seen as a means through which airlines can attract much needed financial resources and achieve greater efficiency and profitability for shareholders. It is also expected to lead to improved quality of service for passengers and to ease the financial burden on the national treasury. British Airways presents the classic example of a former moribund state airline which has been transformed into one of the most efficient and profitable international carriers.

But privatisation means the loss of control over the entity, particularly if foreign interests are involved. A privatised airline, motivated by the bottom-line may eliminate unprofitable routes or reduce service on thin routes in a bid to maximise profits. This can, not only, disrupt transport links but may adversely affect other industries dependent on the service provided by the airline (for example the tourist industry).

Another fundamental issue is that underlying the decision to privatise airlines is the belief that these can become profitable entities, and that it was the "un-business" like practices of the state owners which prevented this. While the airline industry as a whole may not be inherently unprofitable, given the nature of demand on certain routes and the cost of providing regular scheduled service such routes, the market may fail to provide an adequate supply. This implies that for airlines operating such routes privatisation is not necessarily going to result in improved profitability.

This paper examines the performance of two recently privatised Caribbean carriers: Trinidad and Tobago (BWIA) Limited of Trinidad and Tobago, and Air Jamaica (AJ) of Jamaica.

The airlines were privatised with the expectations that they transformed into profitable entities. Unfortunately, the performance of the airlines in the post privatisation period belied expectations. Despite pursuing divergent strategies both airlines have accumulated huge losses once more and their survival appears even more precarious than before privatisation. Given the continuing poor performance of the two carriers, this paper raises the question as to whether it is possible for these small privately owned carriers to provide a profitable, reliable and credible air service without some kind of financial support. This paper argues that privatisation does not automatically mean improved performance. The terms and conditions of privatisation together with demand and supply conditions facing an airline are likely to determine how successful privatisation is. Previous work have focussed on the role of competitive conditions (barriers to entry, actual competitors, etc) faced by the privatised entity in determining success of privatisation efforts.

The paper first reviews the performance of the two carriers, paying attention to their post privatisation strategies and the impact on the airlines. The paper then considers the thorny question of whether or not it is possible for these small carriers to operate profitably.

OVERVIEW OF TRINIDAD AND TOBAGO (BWIA) INTERNATIONAL

Salient Features of BWIA's Operation

BWIA was originally founded as a private venture under the auspices of the British government in 1940. The carrier was established to provide a service between the British Caribbean islands (mainly Trinidad and Barbados) and between the islands and the rest of the world. BWIA was acquired by the Trinidad and Tobago (TT) government in 1961 when the British based British Overseas Airways Corporations (BOAC), the parent company of the then BWIA, took a decision to abandon the service it provided to the region because it could no longer cover the operational losses incurred by its subsidiary. To ensure continued air access and to protect the jobs of those involved in the industry, the government of TT took over the operations of the airline.

BWIA is a very small airline by international standards, carrying just over one million

passengers annually (Table 1). BWIA currently links the Eastern Caribbean and Guyana with the international community. BWIA is popularly referred to as the "regional carrier". Although BWIA was "substantially owned and controlled" by the TT government, for a number of countries in the subregion the airline has served as their *de facto* national carrier¹. Some countries have formally designated BWIA as their national carrier in their air services agreement (ASA).

BWIA has a very limited route network consisting of four major international gateways: Miami and New York in the United States (US), Toronto in Canada and London in the United Kingdom (UK). Prior to privatisation, BWIA provided service to points in mainland Europe, namely Zurich, Stockholm and Frankfurt. BWIA's passengers are concentrated in the gateway cities served by the airline: for example in 1994 33% of Miami traffic were resident in Florida; 83% of traffic on the New York route were domiciled in that city and 88% of Canadian traffic resided in Ontario. The airline reaches very little beyond gateway traffic. BWIA's main scheduled competitor on the London route is British Airways, while AA has been the main rival on the United States routes since the demise of Pan Am and Eastern Airlines. On the Toronto route BWIA competes with Air Canada. BWIA is a minor player in the market except for its home market and a few of the thinner routes. Its main rivals account for most of the capacity on the routes.

BWIA also provides an intra-Caribbean service covering the Eastern Caribbean, Jamaica, the Dutch Antilles, and Georgetown and Caracas on the South American mainland. Service on these routes varies over time in response to demand conditions. On the intra-Caribbean routes, until recently, BWIA's main rival was Leeward Islands Air Transport (LIAT)². Within the last few years, other regional based carriers have begun serving the intra-Caribbean routes - Helen

In 1983 countries belonging to the Caribbean Community won the approval of the International Civil Aviation Organisation (ICAO) of the "Community of Interest" principle which allowed member states of the community to designate the airline of another member state as its national carrier. This allows other CARICOM states to designate BWIA as their national carrier. This principle received support from the US, but the UK has been reluctant to adhere to this.

This airline was owned by twelve regional governments. In 1996 LIAT was privatised. The airline's network covers the English speaking Caribbean, as well as the Dutch and French speaking Caribbean.

Air, Air Caribbean and the now defunct Carib Express³.

Most of the airline's traffic originates from its Northern gateways. Traffic on the European and Canadian routes is made up primarily of holiday and tourist traffic (approximately 60%). The US routes also have a significant share of tourist traffic, but a somewhat larger share of VFR traffic. The profile of the airline's passengers suggests that the airline is operating in the price sensitive end of the market. Much of the air travel in the Caribbean is associated with the vital tourist industry that dominates the economies of many of these countries. Some charter service is present on BWIA's main routes.

BWIA operated unprofitably, and suffered from serious internal inefficiencies. The airline had a record of poor on time performance, delays and cancellations and as a result a very high poor service cost. BWIA has a history of loss making. Losses for the period 1983 to 1992 amounted to US\$ 220.3 million. BWIA owes its survival to the generous subsidies it received from the government. In 1986 the airline was mandated to achieve financial independence, and subsidies were drastically cut. This culminated in the privatisation of the airline in 1995.

Post Privatisation Reorganisation

Privatisation was intended to put the airline on a sound financial footing. The airline suffered from a chronic lack of working capital and it was argued that privatisation in conjunction with a joint venture with an international carrier would secure the future of the airline. A joint venture was considered necessary to enable the carrier to widen its market access to beyond gateway traffic, and to overcome some of the disadvantages associated with its small size. The TT government envisioned the privatisation of BWIA in the context of the rationalisation of the airline industry in the Caribbean and the creation of a single regional airline. By 1994 discussions were held with eleven (11) major airlines without any notable progress in finding a suitable partner. Similarly, little progress was made in establishing a regional airline. As a lead up to privatisation, several initiatives were undertaken to improve the

³ Carib Express was formed in February, 1995, partially owned by British Airways and investors from the Caribbean private sector. The airline went bankrupt one year later.

airline's operation but all proved ineffective. This internal restructuring consisted of major cost cuts including staff reduction, route rationalisation, the discontinuation of first class service and its replacement with a business service⁴.

TT (BWIA) International Limited was divested in February, 1995 to a group of private investors headed by the Acker Group and Loeb Partners of the United States. The Acker Group was originally hired to locate a buyer for the airline. Fifty-one percent (51%) of the shares were sold to foreign and domestic investors for US\$20 million, and the government retained a 33.5% share together with a golden share. The rest of the shares went to employees of the company. The golden share gave the government veto powers over certain decisions considered vital to preserving the national interest. Nevertheless, effective control of the airline passed to Acker and Loeb partners, minority shareholders. The agreement provided for the private sector to vote as a block. For an investment that represented less than five percent of the total value of shares this group gained effective control of BWIA. The new carrier was designated as the sole national carrier for 15 years. The agreement also provided for the government to absorb losses up to a limit of US\$20 million.

The primary focus of the new management was on consolidating and streamlining the existing operation. This was to be attempted through a combination of internal reorganisation and formation of number of critical strategic alliances. Internal reorganisation efforts concentrated on service enhancement and route restructuring.

Service Enhancement

This entailed a "repackaging" of the service offered to upgrade quality. This included schedule revisions to have more consistent departure and arrival times in line with demand and to improve on time performance. The plan envisaged keeping two aircraft in back up service to improve on time performance and cancellations, and the placing of the larger aircraft (L1011s) exclusively on the New York and Toronto routes. BWIA also attempted to consolidate its traffic base through building customer loyalty rather than simply relying on the goodwill of Caribbean

⁴ This was referred to by the management as right-sizing.

nationals. To this end the airline introduced its frequent flyer programme and the BWIA/Royal Bank Mastercard, the Sky Pass (a card which allowed customers to purchase tickets on credit). Finally, there were plans to reorganise the way in which the airline delivered its service through the formation of strategic alliances (discussed below).

The route rationalisation/restructuring

The plan called for the elimination of marginal routes, replacing these where viable with an indirect service in conjunction with a partner airline and the expansion of service on more promising routes. Service on some European routes was earmarked to be cut, whilst service to the Caribbean and South America, where it was expected the yield would be higher, was to be expanded. In 1996, unprofitable direct service to Frankfurt and Zurich was dropped in the hope of replacing this with indirect service via London⁵. The success of this strategy revolved around the airline's ability to enter into partnership with other carriers.

Formation of strategic alliances

A major concern was with improving the flow of traffic within BWIA's network. The existing bilateral agreements have limited BWIA to gateway traffic. To overcome restricted market access, the strategy envisaged BWIA entering into a network of alliances involving at least one major international airline and a number of smaller regional carriers in each of its major markets to tap beyond gateway traffic⁶. Such a network of alliances would permit the new BWIA to replace unprofitable direct service with indirect service via a hub and to increase the traffic on its network through the additional feed provided by these alliances.

For example it was proposed that London could be developed as the airline's European hub in conjunction with a strategic partner. In this way traffic beyond London would be

⁵The abandonment of some routes by the airlines led to some governments expressing dissatisfaction with this.

The business plan put forward by the Acker Group cited an alliance with American Airlines and American Eagle, BWIA's main competitor for traffic on the US routes, for feed into JFK and Miami in the US; Air Canada for feed into Toronto; British Midland for feed into London Heathrow from the UK and Europe; LIAT for feed to Barbados, Antigua and Port-of-Spain from other Caribbean countries; ACERA for feed into Caracas; and TABA in Brazil.

accommodated via indirect service through London. A similar sort of strategy was proposed for the airline's North American routes. So far BWIA has failed to find a suitable partner, and no significant agreement has been entered into with another airline. One of the sticking points is that BWIA as a stand alone proposition, without control of intra-regional feed, is not seen by foreign carriers as an attractive partner⁷. Foreign carriers that have expressed an interest, have linked their involvement to the merger of BWIA and the intra-regional carrier, LIAT. Some of the offers required BWIA to reduce its international service which it was not prepared to do. In a move to control its intra-regional feed, BWIA acquired a 29% stake in the privatised intra-regional carrier, LIAT, in 1995. This has allowed the two airlines to engage in some low level cooperation.

Fleet Replacement

An essential element of the post privatisation reorganisation, according to the new management was the replacement of BWIA's aging fleet. Its four L1011 aircraft were approaching twenty years old. The plan provided for the replacement of the airline's MD83s with Boeing 757-200 by the summer of 1995, and the four L1011-500 with Boeing 767-300 ER on a 2 for 1 basis by September 1995. The fleet replacement programme ran into difficulty because of, among other things, questionable management decisions. Two Airbus aircraft were purchased instead of the Boeing jets. These were subsequently found to be unsuitable for BWIA's routes, as they could not fly nonstop between Barbados/Trinidad and North America. The first aircraft which was purchased in July 1996 had to remain grounded while the airline incurred significant lease cost. The decision to purchase the Airbus was made at the expense of major engine repairs. The failure to renew the fleet as planned impacted negatively on BWIA's performance in 1996/97. Multiple engine failures disrupted service, severely affecting on time performance and schedule integrity. This resulted in a serious deterioration in the quality of service provided by the airline. On time performance and cancellations reached record unfavourable levels. The

⁷In 1997 Virgin Atlantic offered US\$20 million for a 20% stake in the carrier. This offer was refused by the management, but the deal was favoured by the government

frequent cancellations and delays did enormous damage to the attempts to enhance the image of the airline and its finances. Unplanned expenses associated with engine repairs, lease of replacement engines, and poor service totalled US\$15 million in 1996.

Other Elements in Strategy

Other elements in the business plan included proposals to enhance yield management, to introduce a state of the art CRS, and to expand non-core revenue activities: such as duty free sales, catering, ground handling, maintenance, freight and charter service⁸. Immediately upon privatisation, BWIA entered into an agreement with its main rival, AA, for the use of its Sabre computer reservation system and for ground handling service at JFK. Cost reduction was another important dimension of the corporate strategy. Cost reductions were expected to come mainly from the out-sourcing of service to strategic partners, and by reductions in personnel costs, route expense and ground handling charges. The airline has achieved limited success in most of the above areas.

Assessment

Some of the difficulty encountered by the airline seems to have been self inflicted. The US based executives appeared to have pursued objectives at odds with those of the other shareholders and with the business plan. The lease of the unsuitable Airbus aircraft from a subsidiary of BWIA's largest foreign shareholder raised questions about conflict of interest. The foreign based executives were accused of not spending enough time in Trinidad managing the affairs of the airline, and of uncontrolled expenditure. A former Chief Operation Officer complained that the lack of focus by management on the core business plan that called for "rigid cost control and reduction" was at the root of the airline's trouble. The Government's agreement to fund up to US\$20 million worth of losses may have encouraged a degree of laxness.

BWIA made losses totalling US\$21 million and US\$10.2 in 1996 and 1997 respectively.

To earn incremental revenue BWIA attempted to re-enter the domestic market. Limited access was granted but this was eventually stopped by a court order.

The shareholders' equity was rapidly eroded. In the face of mounting losses and the growing dissatisfaction by the TT government, a new management team was hired in February 1998. Between 1995 and 1998, the airline has had four management changes. The immediate concern of the new team was on crisis management and forestalling a collapse of the airline. The government peeved over its lack of influence on the privatised airline has refused to come to the rescue of the airline⁹.

The failure to find a strategic partner, a central element of the business plan, meant that the cost reductions and revenue opportunities projected to come from this source never materialised. This should have led to a rethink of the approach. This did not seem to have occurred. The rapid deterioration of the finances of the new airline left little room for strategic long term planning. Little attention was given to developments in its environment such as the emergence of Air Caribbean and AJ as threats on its intra-Caribbean routes and possibly on its international routes. No policies were articulated to confront the threat posed by the airline's major rivals. There was really no move by the new management to carve out a niche for itself in the increasingly competitive market place.

One of the lessons of the BWIA experience is that without proper incentives and or sanctions, private sector managers can pursue goals at odds with that of profit maximisation just like public sectors managers. It is clear that the private sector managers pursued objectives which were in conflict with those of the majority of the shareholders - a classic case of moral hazard. The terms of privatisation allowed a group with very little to lose financially take effective control of the airline.

OVERVIEW OF AIR JAMAICA

With the assistance of BWIA, and in partnership with Air Canada, AJ was established as the national carrier of Jamaica in 1969. The government of Jamaica was the majority shareholder while Air Canada had a minority interest. The latter provided technical assistance and managerial

The Minister of Finance complained publicly that despite being the largest single share holder (owning 33.5% of the shares) it had no say in the running of the airline.

expertise. Air Canada gradually reduced its 40% share holding and by 1979 the Jamaican government wholly controlled the airline. The growing concern for the need to provide safe, reliable and sustainable air transportation, especially for the vital tourist industry was cited as the reason for the state's interest in starting a new airline controlled by Jamaicans. Jamaica has had the experience of foreign carriers withdrawing their services when profitability declined and expanding service when the market improved. In the 1970s Pan Am, Lufthansa, Air Florida and Challenge withdrew from Jamaica. This made policy makers wary of foreign carriers. To provide a steady and reliable air service to support the vital tourist was central in the minds of planners.

Salient Features of Air Jamaica's Operations

Air Jamaica is a small carrier by international standards (Table 2). The airline initially provided air links between Jamaica and gateways in the United States, eventually service was added to Canada and London. Some service was established to the Northern Caribbean, namely, Cayman Islands and the Bahamas. The airline began offering service to the Bahamas in 1991.. Prior to privatisation the carrier was in the main a Jamaican airline, servicing traffic beginning or terminating there. The airline was established to serve primarily the interest of the Jamaican travelling public and its tourist industry. The airline operated from two points within Jamaica, Kingston and Montego Bay. The route network consisted of a series of point to point service.

Like BWIA, AJ has a very limited route network, flying to the United States, London and some Caribbean territories. Up to 1977, the USA-Jamaica air services agreement (ASA) allowed the airline to operate to five points in the US: New York¹⁰, Miami, Philadelphia, Detroit and Chicago. In 1978, a new open skies' ASA, gave Jamaica five additional points in the United States. These points were not specified, and this gave AJ some flexibility in its service to the United States. The airline provided service to Los Angeles on a contractual basis for Jamaica Vacations Ltd. The US routes tended to be more competitive with at least two scheduled US carriers competing with the Jamaican airline. With the 1978 open skies agreement, competition intensified sharply as the number of US carriers designated to provide scheduled service and the

The recent BASA considers Newark, New Jersey and New York as a single point.

number of available seat increased (Rattray, 1988; p.22)¹¹. The growing presence of charter airlines on prime routes such as New York, Miami and Philadelphia made these routes more competitive.

The London route was a closed duopoly shared between AJ and British Airways. AJ entered into a commercial agreement with British Airways for the latter to operate the route on its behalf. A similar type of arrangement existed with Air Canada for the Toronto route. The history of AJ is closely intertwined with the Jamaican tourist industry and the airline's traffic is dominated by tourists out of the United States. The airline is heavily used by Jamaicans resident both at home and abroad.

Fortune has not favoured the carrier. The airline broke even in 1971, made a small profit in 1972 and 1973, and since then have incurred losses every year. By March 1994, the airline had accumulated losses of US\$1,628 million. The government was unable to continue funding these losses. Lack of sufficient capital resources to fuel growth was a problem that plagued the airline. In May 1994 agreement was reached on the privatisation of AJ. A new company, AJ Holdings Limited was formed and 100% of the old AJ shares were transferred to this company. The government retained a 25% interest in the new AJ, whilst 70% of the company was sold to the AJ Acquisition Group, a consortium of local investors, for US\$52 million. The other 5 percent of the shares were held for an employee stock ownership programme. AJ remained the national carrier of Jamaica and control of the airline passed to the private sector interest in November 1994. Controlling interest in the airline is held by the owner of the Sandals chain of hotels, Mr Gordon 'Butch' Stewart. This marks the first comprehensive alliance between tourist industry and air travel industry in the Caribbean region. AJ was expected to benefit greatly from the resources controlled by this group.

Post Privatisation Reorganisation

At the privatised AJ a foreign team of experts was brought in to run the affairs of the company. The new management adopted an aggressive expansion programme involving its

A moratorium on additional capacity on the Miami and New York was implemented for one year in 1984.

routes and capacity. The airline's business plan identified the main challenges as the need to implement cost savings and increase aircraft utilisation; increased competition from US carriers; lack of beyond gateway traffic; and unprofitable routes on which fixed cost outstripped revenue. The airline was diagnosed as having too high operating cost relative to the passengers carried. The approach adopted by the new management was to attempt to grow the airline out of its difficulties. The essential elements of this approach are detailed below.

Route Expansion

The new AJ embarked on an ambitious expansion of its routes. This included expanding its extra-regional network, as well as, its intra-Caribbean one. The carrier began service to new points in the United States, and restarted abandoned ones: AJ started service to Chicago, Ft Lauderdale, Los Angeles and Newark. Service to London was restarted. An interesting development was the aggressive thrust of AJ into the Eastern Caribbean - namely to Antigua, Barbados and St Lucia - in direct competition with BWIA. The airline was successful in getting designated as the national carrier for these countries on its US routes. This expansion was into the main tourist destinations in the Eastern Caribbean region. AJ offers a choice of direct service from these points to the US, or a one stop service via Montego Bay. Upon privatisation, the new management sought to reorganise the airline's network around a new hub in Montego Bay. Previously the airline's operations were concentrated at Kingston.

Establishment of the Montego Bay hub

The Montego Bay hub is being promoted as the "New Gateway to the Caribbean". It is intended to link points in the Eastern Caribbean with AJ's US gateways. The hub offers connections to some northern Caribbean destinations as well. The incorporation of the Eastern Caribbean into the airline's route network itself represented a radical development. The old AJ had shown no interest in developing service to the Eastern Caribbean. This new focus was an attempt to capitalise on a niche identified in the market, and to combat AA's dominance. AJ, through its Montego Bay hub aims at offering US passengers an alternative route for travelling between the Caribbean and the United States. AA with its extensive domestic and international

network channels traffic to the Caribbean through its Miami and San Juan hubs. From Miami, AA offers jet service to a limited number of Caribbean points. The San Juan hub which caters for the thinner routes in the Eastern Caribbean offers a turboprop service via its subsidiary, American Eagle¹². BWIA offers direct service from only two US gateways to the Eastern Caribbean. The Montego Bay hub provides a one-stop connection from mainland USA to the Eastern Caribbean. The attraction of this service, according to AJ management is that AJ is providing "jet to jet" service via its hub, and an early arrival time in the Caribbean (11.00 am) unlike the service of its main rival, AA¹³.

The improved access through Montego Bay was expected to increase tourist arrivals which would lead to improved aircraft utilisation rate. Finally it was anticipated that the Montego Bay hub would enhance the quality of the airline's product by offering tourists multiple destination vacations. The hub had limited success initially. During the first year of operation, passenger volume remained low. The hub which was intended to accommodate tourist traffic originating in the United States attracted mainly Caribbean residents. The under-utilisation of the hub was attributed to the lack of familiarity of US residents with the Montego Bay connection, inadequate marketing in North America and certain operational difficulties - such as lack of automation at out-stations which caused inconvenience to passengers who had to re-check on getting to Montego Bay intransit to their final destination, and insufficient check-in facilities and staff which led to an inefficient handling of passengers (Tharkur, 1998 p; 35). AJ was forced to scale back its operations. The airline's rapid expansion of capacity on the new Eastern Caribbean routes in the face of flat traffic growth led to low load factors¹⁴. In February, 1998, AJ was forced to withdraw services from two of its Caribbean destinations (Antigua and Turks and Caicos

American Airlines withdrew its jet service from San Juan to the Eastern Caribbean in April 1998. In order for the islands to continue offering a direct jet service from Miami American Airlines requested some payments from the governments of Grenada and St Lucia.

¹³With connections via AA' San Juan hub passengers transfer to turboprop aircraft on American Eagle.

The Eastern Caribbean service was initially started with six (6) flights per week. This was increased to eight (8) six months later and then to twelve (12). In February 1998 the service was reduced to six flights per week, three direct flights and the others via Montego Bay.

Islands) and reduce its flight offer to Barbados and St Lucia to cut losses.

The airline subsequently undertook an extensive advertising campaign and this is beginning to bear fruit. According to AJ's manager of Eastern Caribbean Operations, the hub is now more heavily utilised by US based travellers. Some 73% of the traffic through the hub now originates in the US, most of this being tourist traffic. The success of the hub is intimately linked to the airline's success in getting holiday makers to route their Eastern Caribbean vacation through Montego Bay. This is where the AJ's link with the holiday group is likely to reap benefits. The hub concept is being vigorously promoted and the airline's latest policy is to allow en-route stops on this service. The pattern of service offer is intended to develop the multiple destination tourist clientele benefitting both the airline and the tourist industry.

Strategic alliance

Initially not much attention was given to entering into strategic alliances, but subsequently this assumed some importance. One of the problems identified was lack of sufficient feed on AJ's routes. At first, management attempted to increase the traffic within AJ's network by extending its route coverage, and through the re-imaging of the carrier as an international carrier of high quality. Subsequently it sought to increase feed through partnership with other carriers. In November 1995, the AJ Acquisition Group acquired majority ownership in the domestic airline, Trans Jamaica. This was established as AJ Express to link domestic traffic with the airline's international network. AJ in 1997 signed a major commercial arrangement with Delta Airlines which came into effect in 1998. This is a complementary arrangement as it permits AJ to access much needed beyond gateway traffic and Delta to gain entry into the Caribbean market. The alliance provides for the airlines to code-share on service between the United States, Jamaica and the Eastern Caribbean islands. The agreement also covers Delta providing code share/blocked spaced flights with AJ. Delta code share on flights from Atlanta, Miami and New York, JFK to Montego Bay, Kingston, Barbados, St Lucia and Antigua (AJ's south bound flights). AJ code-share on Delta's daily service to Boston, Hartford, CT/Springfield, MA, Cincinnati, Memphis and San Francisco. The agreement allows AJ access to Delta's extensive domestic network, and gives Delta access to AJ's service throughout the Caribbean. It is too early

to tell how the recent announcement by Delta to launch 26 daily flights into the Caribbean and Central America will affect this agreement.

Re-imaging of the carrier

The new management has expended significant effort building up the image of the airline. This thrust focused on enhancing the product offered by the carrier. It involved the introduction of red carpet treatment for all passengers, improved in-flight service - for example champagne flight with full meal, the reintroduction of fashion shows on US routes featuring resort fashions, and an on-board chef. To build customer loyalty, the airline's Seventh Heaven Frequent Flyer Programme was introduced - this allowed the passenger to travel free on the seventh trip; an agreement was reached with United Airlines which allowed AJ's passengers to participate in that airline's FFP and *vice versa*. On time performance was also improved to ensure the credibility and reliability of service. The re-imaging of the carrier was backed up with the introduction of a new fleet.

Fleet Renewal and Fleet Expansion

Upon privatisation a decision was taken to retire the old and inefficient units in the fleet. The airline acquired six A310s through operation leases and purchased four new aircraft (A320s) by finance lease. The fleet was expanded from 9 to 14 aircraft. The modernisation of the fleet was expected to yield cost savings in the areas of labour, fuel and maintenance, improve fleet reliability and enhance customer satisfaction and ultimately impact on revenue. The expansion was also thought necessary to accommodate AJ's growing route network. The first two A320s were delivered in December 1996 and the other two in the second quarter of 1997. The new fleet had to remain grounded for over 12 months because of technical difficulties associated with Jamaica receiving a Category II rating from the US Federal Aviation Authority (FAA).

External Developments

AJ's expansion plans were derailed by the US FAA awarding Jamaica a Category II rating in 1995. This reflected the FAA's dissatisfaction with the operations of the Jamaican civil

aviation authority. This rating imposed serious restrictions on the national airline: countries that are rated Category II have their level of service to the US and the number of aircraft in service frozen as at the time of categorisation. With such a rating, expansion can only come through the wet leasing of aircraft from a country with a Category I status to operate more flights or new routes. The Category II rating prevented AJ from introducing its new wide-bodied plane; it halted the expansion on old routes and the startup of new routes to the US. In order to operate new services, AJ had to wet lease planes to honour its new schedule. The planned expansion into the US was effectively stymied. Equally important, the decision raised the airline's cost substantially and adversely affected revenue and this helped to erode its equity base. Apart from having to fund the expansion programme, additional cost was incurred to wet lease aircraft, while the two recently purchased Airbus aircraft remained idle. The airline's management estimated that the restrictions cost the airline US\$22 million. Jamaica's Category I rating was restored this year.

Assessment

Unlike BWIA, AJ attempted to strengthen and consolidate its competitive position by adopting an expansionary stance. In response to AA dominance on US routes, AJ tried to create a niche for itself in the tourist market between the US and the Eastern Caribbean by offering unique routing via Montego Bay. This was supplemented with a strong marketing/customer orientated strategy which aimed at creating a strong brand image, improving the quality of customer service, and binding customers to the airline. To some extent this proved successful. AJ reported that it increased the number of passenger carried yearly by 62%. Unfortunately the increase in uplift was not reflected in the airline's accounts. At the end of 1997, AJ had incurred significant losses in spite of its attempt to grow itself out of its financial problems. The expansion plan required large capital outlays. Apart from this, the airline incurred sizeable extraordinary expenses associated with the Category II rating. The airline reported losses for each of the years since privatisation. In 1996, the operating loss was US\$47 million, in 1997 this was US\$60 million and for 1998 this has been projected at US\$35 million. A report by the Ministry of Finance noted that **all** routes returned losses and no significant advance was made in

reducing cost while passenger yield remained unchanged over 1995-1997. In 1997 the government was called upon to provide guaranteed support to the tune of US\$100 million. In January 1998 the airline again sought immediate cash injection of US\$80 million, with a request for an additional US\$30 million for 1999.

In light of the huge losses suffered conflict arose among the shareholders about the appropriate strategy for the airline. Questions were raised about the decision to expand intra-Caribbean routes and to establish the Montego Bay hub. Both ventures were considered a drain on the airline's finances. One side favoured a continuation with the planned expansion, whilst the other, including the Chief Executive Officer (CEO) and the government, felt the airline should downsize and restructure its activities. The former side won with the departure of the CEO. Like BWIA, AJ has changed its CEO four times since privatisation.

It would appear that AJ's management adopted a more strategic approach to reorganisation than BWIA. The moral hazard problem which affected BWIA was not present, even though there was some conflict among shareholders about the appropriate way forward. The AJ's experience also demonstrates the ease with which well conceived plans can be undermined by circumstances over which managers have little control.

IS PROFITABILITY POSSIBLE?

Despite pursuing very divergent paths, both BWIA and AJ have incurred huge losses and their equity eroded. In both cases there was minimal government involvement. Yet the experience of the privatised airlines closely mirrored their performance as state-owned entities. From the above account, it is clear that external factors as well as poor management decisions adversely affected the performance of the privatised carriers. Nevertheless, the similar experience under public and private ownership, irrespective of corporate strategy pursued and despite the many changes in management, lead one to question whether the routes operated by these carriers are of themselves inherently unprofitable. Is the cost of operating these routes too high compared with the revenue generated on the routes? Detailed information on cost and demand is needed to come to a definitive conclusion. Nevertheless, an examination of available evidence may help to provide a partial answer.

Caribbean airlines are generally perceived as inefficient and high cost, but a recent study (Melville; 1995) found that in 1992, BWIA achieved unit operating costs comparable to the industry's lowest cost operators such as American, Delta, Singapore Airlines and United. This same study found that despite having similar cost structure, BWIA's yield was much lower than the other airlines'. This finding seems to suggest that BWIA's inability to achieve profitability may not be due solely to cost inefficiency, but may be related to the nature of demand which the airline faces. The structure of demand may be such that it not possible to generate adequate revenue to cover the cost of providing a regular scheduled service on these routes.

By international standards, the volume of traffic on Caribbean routes is very thin and this is dominated by tourist traffic. AA's director of marketing for the Atlantic and the Caribbean alluded to the problem facing Caribbean air transport because of these features. He observed that:

"...tourists are travelling to the region at discounted fares and that does not translate into large profit margins.... [While] there is a high demand for the Caribbean as a tourist destination, international airlines were reluctant to expand service based on the small profits realised." (Express March 28 1998; p.4)

He also noted that:

"....The Caribbean was promoted through tour organisers and the all inclusive resorts and because of this airlines were not realising full fares and full profits on the routes" (Express March 28 1998; p.4).

The basic problem that is being articulated is that the yield associated with the carriage of passenger traffic on Caribbean routes is too low. Given the nature of the major users of air transport on these routes (mainly tourist traffic), it would seem the fare that can be extracted from them is very low, and as a result the margin of profitability minimal. The withdrawal of British Airways and United Airlines from the Trinidad market in 1994, and the recent decision of AA to terminate its jet service to the Eastern Caribbean and its subsequent request for payment from the government of Grenada and St. Lucia in order to provide a direct jet service from Miami may be indicative of the problem. Upon privatisation, BWIA terminated service on some clearly unprofitable routes, so too has AJ. Over the years, foreign carriers have entered and exited the market as the profit opportunities dictated, the regional carriers acting as swing "producers".

Caribbean airlines are involved in providing a scheduled service with all that implies for cost, but the markets served bear strong characteristics of a charter market. The revenue on the routes may allow carriers to recover only their marginal cost and a fraction of their fixed cost. For the Caribbean airlines, these relatively thin tourist routes are the significant part of their operation in most cases accounting more than 90 percent of total revenue. This has to carry all the cost. The foreign carriers serving the region, such as AA and BA, have significant domestic and international network. Their operation in the Caribbean is merely a marginal add on (Rattray, 1988; p.23). Such airlines may be able to engage in marginal cost pricing to the Caribbean and still earn a return. In the case of the Caribbean carriers marginal cost pricing may lead to significant losses.

If the above is an accurate analysis of the situation then privatisation is not going to result in any improvement in the financial viability of the carriers. The airlines will continue to operate unprofitably (whether private or public) unless a subsidy is provided for some routes. To the extent it is deemed essential the region have guaranteed airlift, then the provision of regular scheduled service by Caribbean carriers may be in the nature of a "merit good" requiring financial support. This does not mean the treasury must bear the burden, but those that benefit most can be required to meet some of this cost (for example the tourist industry).

CONCLUSION

Although under certain circumstances, privatisation of poorly performing airlines can lead to major improvements, privatisation may vitiate the very rationale for the state's involvement in the industry in the first place. A widely held belief is that many countries, especially developing countries, desired to own their airline for reasons having to do with prestige or national pride. This may indeed be so, but in many cases, the decision to establish a national airline was related to the pursuit and preservation of the what was perceived as the national interest: the desire to have a stable, reliable, and adequate air service. Very simply, some governments felt that their transport security depended on national control of the supply of air services. Foreign carriers are in the main "footloose" responding rapidly to changed profit opportunities and their own

corporate objectives. For larger countries with an abundance of air access this is not necessarily a problem. For the Caribbean where one or two carriers operate a route, the decision of one carrier to withdraw can result in severe economic disruptions. Over 90% of the Caribbean's transport needs are met by air transport. Further for many of these islands, tourism is the lifeblood of their economies, and any disruption of air service can deal a telling blow to these economies. Transport security and the preservation of uplift for the vital tourist industry are critical concerns among Caribbean policy makers. As Rattray (1988) observed "[n]ational pride should not in itself serve to justify the creation of a national airline; but national needs and objectives may render a national airline indispensable".

The review has shown that privatisation does not put carriers automatically on the track to profitability. The terms and conditions of privatisation are important. Those who have effective control must be made to act in ways consistent with the pursuit of profitability. Similarly privatisation, with accompanying cost control strategies by themselves are not sufficient to enable the airlines to survive in an increasingly competitive industry. Some attention must be given to the demand side and to addressing the deficiencies there. The small volumes of traffic and the price sensitive nature of the majority of this traffic may be undermining the viability of providing dedicated scheduled service on some of these routes.

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Table 1: BWIA's Operating Statistics, 1992-97

	1992	1993	1994	1995	1996	1997 ¹
Passengers ('000)	999	936	897	947	902	626
Available Seat Miles (Mn)	3,002	2,927	2,573	2,797	2,580	1,834
Revenue Passenger Miles (Mn)	2,044	1,972	1,723	1,807	1,658	1,266
Load Factor (%)	68	67	67	65	64	69
Passenger yield per RPM (US cents)	10.5	9.7	10.4	9.4	11.5	11.4
Employees	2,605	2,345	2,221	2,357	2,464	2,484
RPM per employee ('000)	785	841	776	767	703	na

¹Data for Jan- Sept

Source: BWIA International

Table 2: Air Jamaica's Operating Statistics, 1994-96

	1994	1995	1996
Passengers ('000)	935	1,078	1,258
Available Seat Miles (Mn)	1,144	1,617	2,218
Revenue Passenger Miles (Mn)	660	987	1,333
Load Factor (%)	58	61	69
Employees	1,239	1,573	1,753
RMP per employee ('000)	533	627	760

Source: Air Jamaica

58-03

The role of capital productivity in British Airways' financial recovery

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Abstract

British Airways (BA) was privatised in 1987, but its financial recovery occurred a number of years earlier. This recovery was sustained throughout the early 1990s economic recession, a period when few major airlines were operating profitably. This paper examines the role of productivity developments at British Airways from the early 1980s through to 1996. The emphasis is on capital productivity and investment, but changes in capital intensity and labour productivity are also evaluated.

Various measures are considered for both capital and labour productivity: outputs are measured in available tonne-kms (ATKs) and revenue tonne-kms (RTKs), with the former preferred over the latter two measures, after adjustment for work performed by BA for others. Capital inputs are measured in equivalent lease costs adjusted to constant prices, with a different treatment of flight and ground equipment or assets. Labour inputs are derived from total payroll costs deflated by a UK wage price index.

The airline made considerable capital investments over the period, and at the same time went through two major processes of labour restructuring. This resulted in a gradual increase in capital intensity, relative high labour productivity growth, but poor capital productivity performance. However, capital investment played an important role in the airline's sustained labour and total factor productivity over the whole period.

1 Introduction

Considerable attention has been given to airline labour productivity, both by researchers and management (see for example Alamdari & Morrell, 1997). Often, the word productivity is used to describe labour productivity, with no recognition of the role played by capital and total factor productivity¹. At the same time, airlines generally emphasise their prowess in technological developments, even though these might not compare as well with other industries as they have in the past.

The airline industry has often been described as capital intensive, although this is somewhat misleading, since labour costs account for up to 35-40% of total costs for some airlines, compared to capital costs of 10-15%. The capital intensive label is probably derived from the fact that airlines operate aircraft costing as much as \$150

¹ For example. Air Canada in its 1997 Annual Report. p.33

million each. These aircraft, together with spares and related flight equipment, account for a very large proportion of an airlines' fixed assets.

Given the importance of aircraft to an airline's success, much research has been undertaken in the area of technical aircraft efficiency, and some analysis has taken place of aircraft utilisation. However, little work has been published on the relationship between technical efficiency and the intensity of aircraft use on the one hand, and the cost of aircraft and related finance on the other. Some studies have examined total factor productivity, and by implication capital productivity (see for example, Forsythe, 1985 and Oum & Yu, 1995). But most focus on labour productivity, partly because of trends in the 1970s and 1980s towards overmanning and labour inefficiency, and partly because simple measures can be used with readily available data.

While much attention has recently been applied to labour, there are signs that the airline industry is becoming more capital intensive. In aircraft maintenance, expensive test and monitoring equipment is replacing more labour intensive component repair, while at airports self-service check-in and ticketing machines are becoming more common. In the air, two pilot operations are fast becoming the norm. Capital charges (depreciation, rentals and net interest) increased from 5.6% of total costs in 1980 to 11.8% in 1995 for British Airways. Capacity costs (depreciation and lease) per ATK for the same airline increased at a compound average growth rate of 8.2% a year between 1979 and 1994, compared with 3.1% for labour costs per ATK, 1.2% for fuel and oil costs, and 3.6% for other operating costs.

The purpose of this paper is to examine capital productivity trends for BA pre- and post-privatisation. The analysis covers a period from 1982/83² through the privatisation in February 1987 to the early 1990s major economic recession and subsequent recovery to 1996/97. It is of note that BA were one of the few airlines to continue to be profitable throughout the post Gulf War recession (Figure 1). Sustainable airline profitability can only be achieved in the long-term by growth in total factor productivity, which is in turn driven by investment and technical innovation, and it is their achievements in these areas that this paper addresses.

Insert Figure 1

Thus, while the focus of this paper is on the efficiency with which capital is used, this will be considered in the context of total factor productivity, as well as the efficiency with which other inputs were used, notably labour. Just as labour productivity can increase because of the amount of capital equipment used per employee, so will capital productivity depend on the amount of labour employed, staff skills and organisation, as well as technical improvements.

By limiting the analysis to one airline, with a reasonably consistent accounting system over the period adopted, and based largely in one country, problems of comparability are minimised. Furthermore, a time series approach also enables money value to be converted to volume or quantity estimates by means of price deflators or indexes.

² The second complete financial year following the appointment of Lord King as Chairman

The questions to be addressed in this paper are:

- What was the role of capital investment both in BA's pre-privatisation turnaround, and their subsequent strong profit growth?
- How did the airline's capital productivity growth compare with labour and total factor productivity growth?

To answer these questions, a consistent set of data was needed from the early 1980s to the present. These were available from the airline's annual reports, which gave reasonably consistent data for revenues, expenses, assets, the fleet and employees, and where policy changes were made (eg in the treatment of leased assets), these were clearly identified in the published accounts.

There have been numerous studies that have evaluated partial productivity measures, and many of these have also considered total productivity in terms of aggregate measures such as operating cost per ATK. There have been some more interesting attempts to provide a meaningful analysis of productivity. An earlier study examined airline managerial efficiency using data for 16 European scheduled airlines, regressing labour productivity against five explanatory variables (Pearson, 1976). One of the variables included in the model was aircraft productivity, defined as average aircraft utilisation. Another equation explained unit costs in terms of four explanatory variables including labour but not capital productivity. Managerial efficiency was then measured by each airline's standardised residuals from the two models. Apart from the lack of rigorous statistical testing of the regression models, this work failed to address marketing efficiency, revenues or quality of output, although this weakness was pointed out by the author.

Another earlier study focused entirely on labour productivity, examining partial measures for the various airline staff categories for 10 European and North American airlines (McKinsey, 1977). The study concluded that North American carriers had much higher labour productivity in all staff categories, *because of their generally greater size and network density*. This was one of the few studies that adjusted the data for contracting out and contracting in, by converting third party amounts paid or received into man-years, although the precise method for doing this was not revealed.

The previous weakness of the omission of marketing efficiency in the Pearson productivity study was rectified in a study of 26 airlines from Europe, North America and the Asia/Pacific regions (Doganis and others, 1995). However, lack of data prevented any adjustments to be made for third party work. The study allows a useful time series and cross-sectional comparison of the world's major airlines, both across and within regions, and includes some disaggregate measures such as pilot productivity.

International differences in capital productivity have been very little studied, according to a recent study (McKinsey Global Institute, 1996), and *'even less is known about what causes capital productivity differences'*. This study's main objective was to identify reasons for capital productivity differences between Germany, Japan and the United States. It followed on from earlier research into labour productivity and

employment performance. The study combined a top-down macro analysis with a micro study of five industries: automobiles, food processing, retailing, telecommunications and electric utilities.

The McKinsey researchers defined capital input as the flow of services generated from a given stock of capital, rather than the stock itself. This they measured by identifying each type and age of asset, and dividing the cost by the useful life in years. In some cases they also added financing costs to the original purchase cost of the investment goods. Output was measured where possible in physical units (eg kilowatt hours for electric utilities), and value added for industries with more heterogeneous outputs. Inputs and outputs were denominated in local currencies, and converted into a common currency by using purchasing power parities (PPPs).

2 Measurement of Productivity

2.1 Definition of Airline Output

Airline output can be defined in physical or money terms. Physical units most often used in aggregate measures are available tonne-kms (ATKs) or revenue tonne-kms (RTKs). The first describes production or capacity, and is relevant to those inputs such as flight operations whose effort is related to this, while the second is a measure of traffic, of greater relevance to sales and handling personnel. Monetary measures of output include total revenue, and gross or net value added.

Financial performance measures would clearly relate profit to capital invested in the business. This is not a productivity measure but a measure of financial rather than economic success in meeting the firm's objectives. Its relevance here, however, is the common need to define capital stock or investment.

McKinsey (1996) have a preference for physical measures, but this is not always feasible due both to the difficulty of adding units of a variety of types of output, and also because of quality differences. They also suggest value added or gross output, which overcome both of these difficulties: different types of output can be summed, and higher quality tends to be reflected in higher prices and thus higher revenues or value added. They used value added for all industries except telecommunications (call minutes) and electric utilities (kilowatt hours), where outputs are relatively homogeneous and of constant quality. Value added was defined as factory-gate gross output less purchases of materials and energy. Gross output (also in money terms) was also considered. But both these measures require conversion to a common currency, and this was done using PPPs.

The advantage of monetary measures is that they allow aggregation of both an airline's own services and work performed for others, such as handling and maintenance (see Oum & Yu, 1998). On the other hand, appropriate deflators need to be found for a variety of outputs to accommodate price and exchange rate changes. Physical measures such as ATKs and RTKs record only an airline's own air services, but other services can be converted to equivalent traffic units, as suggested below.

2.2 *Definition of Airline Inputs*

Airlines require inputs of capital, labour, and materials in order to offer flights and associated booking, ground and other services. Inputs, such as airport and air traffic control services purchased from others are themselves the product of capital, labour and materials managed by other agencies.

2.2.1 Labour

The simplest measure of labour is average annual employee numbers. This should be adjusted for part-time staff and many airlines publish annual equivalent levels of staffing. Actual man-hours per annum worked would be a better measure, to take into account differences in holiday entitlement, sickness and absenteeism, but this number is not usually available.

The major problem in using equivalent annual employee numbers on the payroll is in its relationship to output. Employees may work on contracts for other airlines, and this will not appear in physical measures of output, although it will appear in total revenues under third party work. Conversely, part of ATK output may be produced by employees of other firms, where part of the production is outsourced. This would show up in the cost of services provided by other firms. Both these could be converted into equivalent staff numbers. A recent paper avoided this problem by including incidental revenues in outputs (third party work for other airlines), and material and other services bought in as inputs (Oum and Yu, 1995 and 1998).

Here total payroll costs have been deflated by the UK index of average earnings. Output from BA staff working on services to other airlines has been taken into account above. However, the problem of any significant move towards outsourcing has not been addressed. The only major examples of this over the period studied has been the sale of the engine overhaul business to GE in December 1991. The loss of the third party work provided by this unit would result in a reduction in both outputs and inputs. The distortion arises from a shift of the staff and capital employed in overhauling BA's engines to an outside company, which would reduce only inputs (or transfer them to goods and services bought in), and artificially raise productivity.

2.2.2 Capital

The measurement and definition of capital is more complex than labour. The main question is how much capital has actually been consumed over a given period of time?

The stock of capital assets produces a flow or consumption of capital over its useful life. This flow is more appropriate to use as an input of capital, but depreciation is likely to be misleading as a proxy for this, since depreciation allowances are often much greater than the decline in an asset's output producing capacity (Kendrick, 1991). The 1996 McKinsey study highlighted the need to consider monetary values of various capital assets (because of the difficulty in adding physical units of diverse and heterogeneous assets), but converted these to comparable physical units by deflating expenditure-based estimates by the investment goods PPP.

McKinsey considered the flow of service from an asset to be the payments that would be made as if the asset were leased. This would therefore include both depreciation and interest payments. They used this approach for some industries, and for others they divided the capital stock by the useful life for each type of asset, and aggregated these costs to arrive at the total flow of capital services. McKinsey estimated capital stock using the perpetual inventory method. This infers the capital stock from the gross fixed capital formation expenditures and presumed depreciation schedules for each type of asset.

Many authors agree on the inclusion of both depreciation and interest in any measure of capital consumption (see Deakin and Seward, 1969). Some go further to suggest that both dividends and retained earnings should also be included, on the basis that, if the return on loan capital investment (eg interest) is considered, so should the return on equity capital (Kendrick and Creamer, 1961).

One study converted capital (defined in some way) into equivalent man-years of labour, so that labour and capital could be combined to obtain total factor inputs (Smith and Beeching, 1948)

Another study distinguished between the cost of flight equipment and ground property and equipment (Oum and Yu, 1995). An index of flight equipment input quantity was constructed by multiplying the annual lease cost by the number of each aircraft in the fleet, and then weighting the result by the lease price of each aircraft type. The weighting was performed using the translog multilateral index procedure. The real stock of ground property and equipment was estimated using the perpetual inventory method. The annual cost was then computed by multiplying this real stock by a service price. The latter was estimated using the method proposed by Christensen and Jorgenson (1969). This accounts for interest, depreciation, corporate income and property taxes and capital gains. The flight equipment and ground property indexes were then combined into one index, again using the translog procedure.

3 British Airways' Capital Productivity

3.1 Output measurement

Available tonne-kms (ATK) were initially used as a measure of output, reflecting the total airline production. However, the carrier increased its average load factor consistently over the period, the gains from which would be better reflected in revenue tonne-kms (RTK). The second of the two problems referred to above, namely quality, was not considered to introduce any major distortion. Quality of service has many dimensions, but aircraft types used were broadly similar in terms and increasing length of haul is reflected in ATKs and RTKs. On the other hand some increases in average frequencies per route may have occurred, and executive lounges in airport became more common.

The first problem, namely the combination of different types of output, was more significant: in 1996/97, non-RTK generating revenues amounted to £751 million, or

9% of total turnover. These revenues were converted into equivalent RTKs by applying the average yields in each year on BA's own scheduled and charter air services (eg 53.1 pence in 1996/97).

Output growth was relatively modest in the earlier part of the 1980s, especially in the restructuring period which was largely completed by 1983/84 (see Figure 2). This involved the deletion of some routes. Faster growth occurred in the period 1986/87 to 1989/90, when the recession set in. This probably finished a year or so earlier in the UK and US compared to other European countries, and growth was resumed in 1992/93 at around 10% a year.

Insert Figure 2

3.2 *Input measurement*

It was shown above that there is no entirely consistent and satisfactory way to measure capital inputs. It was decided, however, that the flow of capital consumed in each year, rather than the stock of capital, would be the best indicator of what was available to provide airline and related services in that year. Similarly, labour wages and salaries provide better indicators of what was available, reflecting hours actually worked rather than numbers of employees which represent the stock of labour.

Airline capital available consists principally of aircraft, but also of ground equipment, buildings and land. Those that are owned or on finance leases are depreciated over various service lives in the accounts to give some measure of capital consumed. Capital is also available through shorter term or operating leases, which appear in the accounts as an operating expense, combining depreciation and interest charges. Capital input needs to combine both owned and leased assets into an annual estimate of consumption. This money amount then needs to be deflated to take out any price effects to give a volume indicator of input.

Off-balance sheet aircraft operating leases for BA currently account for just under 30% of the total fleet numbers. Rental expenditure for these aircraft gives a good estimate of capital consumption in any year. For owned aircraft, the equivalent lease amount needed to be determined so that total capital input from aircraft could be estimated. This was done by taking the average gross value of the fleet in each year (ie before depreciation) and calculating the lease equivalent using the following standard lease formula:

$$\text{Periodic Rental Payment} = PV + a$$

where: PV = the present value, or equipment cost
 a = the rental factor, which is:

$$a = \frac{1 - (1+i)^{-(n-x)}}{i} + x$$

where: x = number of rentals payable in advance
 n = number of payments in lease term
 i = interest rate per period

The gross fleet value is based on historical costs, updated each year following aircraft withdrawals and additions. For 1996/97, the average gross fleet value was £8.7 billion. These aircraft costs were largely incurred in US dollars and converted to sterling at end year exchange rates. The lease calculation requires inputs of both remaining service or economic life and interest rate. The former was initially set at 25 years less the average age of the fleet in each year, with the interest rate for each year varying at 50 basis points over LIBOR (London Interbank Offered Rate), or for 1996/97 6.0%. This rate of interest is considered the level at which BA would have borrowed, and a variable or floating rate reflected more realistic in relation to both owned and leased aircraft. For lease payments in arrears ($x = 0$), the lease equivalent of the on-balance sheet aircraft amounted to £910 million in 1996/97, to which the off-balance sheet lease aircraft rentals of £119 million were added.

For capital inputs other than aircraft, a lease equivalent was calculated in the same way as for aircraft, but an average remaining life of 5 years was taken, applied to balance sheet gross asset values. It is likely that the majority of these assets would have been acquired in sterling, so that a UK capital goods deflator would be the most appropriate way to convert value estimates to volumes.

The conversion of these aircraft value estimates to volumes would ideally use a US aircraft manufacturing price index applied to the original US dollar capital costs³, and then converted at PPP exchange rates. However, only sterling costs were given, so that a £ deflator was constructed by converting a US\$ index of aircraft prices to sterling using average £/\$ rates of exchange actually applied by BA.

Figure 3 summarises the changes in real inputs over the period studied. It can be seen that after the rationalisation in 1983/84, which continued from the previous year, investment grew over the recovery period to the end of the decade. BA was no exception to the prevailing industry tendency to over-order at the end of a cyclical upswing. However, this was confined to the year 1990/91 when 11 Boeing 747-400s were delivered, together with 5 B767-300s. This was partly financed by a sale and leaseback on 20 B737-200s, a deal which captured a relatively good average price for these aircraft before it declined.

Insert Figure 3

Average aircraft prices expressed in £ sterling increased sharply up to 1985/86, mainly as a result of sterling's depreciation (which would have boosted revenues). The converse was true over the next period to 1988/89, when US\$ aircraft prices hardened as a result of increased demand. While prices turned down as a result of the industry's cyclical downturn, by 1996/97 the index had climbed again to its 1990 high point.

³ The majority of BA's aircraft are US built, although some have UK manufactured engines. A price index based on the manufacturer's labour and materials cost is normally used in the aircraft purchase contract to escalate the agreed price to a delivery year value.

Changes in real labour inputs are also shown in Figure 3 for comparison. The large 1983/84 reflects the last year of the major downsizing from 55,000 to 37,000 staff, with modest increases to match the traffic growth in the second half of the 1980s.

3.3 *Capital productivity*

An initial idea of capital productivity might be gained from examining trends in average ATKs per aircraft. This ratio does not contain price or value data, but averages efficiency over the whole fleet. A change in fleet mix towards more long haul widebodies would increase the ratio without any underlying change in the true productivity of capital used for supplying a specific city-pair of given stage length. What Figure 4 shows is the tendency over the period of the average price of aircraft to increase faster than average aircraft efficiency, particularly towards the end of cyclical upturns.

Insert Figure 4

In the 1960s and 1970s, new aircraft incorporated a larger number of seats, increased lower deck cargo capacity and greater speed and range. This inevitably led to easily identifiable and quantifiable efficiency increases delivered in return for some increases in price. Over the past two decades, however, aircraft size has not grown much on average, but many cost saving improvements have nevertheless been incorporated in the aircraft (eg automated flight deck, modular design for lower maintenance costs). The average payload per aircraft in the BA fleet rose from 29 tonnes in 1982/83 to only 35 tonnes in 1996/97.

The capital productivity measure described below was adjusted RTK output per total lease equivalent input, deflated by a capital price index. It was concluded that this ratio minimised the key problems discussed in the previous sections. Figure 5 shows that after a rise in the first two years, capital productivity on this basis subsequently declined over the remaining part of the decade, after which it remained stable. The early rise was principally due to an increase in the overall load factors from 61.9% in 1982/83 to 67.2% in 1984/85. At the same time there was a shift in emphasis from passengers to cargo, the latter utilising spare lower deck capacity. A marked increase occurred in charter flights, especially in 1983/84, which are inherently more capital efficient through high load factors and higher seat density.

Insert Figure 5

The more productive use of existing capital through more efficient organisation or better trained staff is probably difficult to achieve in any sizeable way in the air transport industry. Flying crew are already highly trained and improvements may show up more in better quality service than higher output.

Aircraft accounted for around two thirds of the total annual capital consumption up to 1990/91, but this share subsequently declined to around 60%. The faster growth in shorter life investments which are not directly related to aircraft would tend to depress

any measure of capital productivity which did not take into account the output quality improvements that such investments tend to produce. This is likely to be the case here, since it has been impossible to incorporate such qualitative changes in the output variable, even though they would certainly have affected inputs, especially those of capital.

3.4 Capital and labour price developments

Figure 6 shows developments in output and input prices expressed in £ sterling terms. The output price index was based on total revenue per RTK. After an increase in the first year, helped by sterling's marked depreciation, it remained stable or drifted down. Airlines had traditionally reacted to a recession by raising fares and sustaining yield increases; however, in the early 1990s recession, competitive discounting led to a decline in local currency yields. For BA this was offset by favourable exchange rate developments, at least against the US dollar, between 1991/92 and 1993/94.

Insert Figure 6

Dollar/sterling exchange rate fluctuations also helped dampen down BA's capital input price index expressed in sterling (Figure 7). This was based on Avmark's estimates of the new price of a B757 aircraft. This was an aircraft type that was offered in relatively standard form over the whole period, and was also an important aircraft in the BA fleet.⁴ The aircraft price index was combined with LIBOR interest rates, upon which the majority of BA's loans and leases are based, to form an overall capital price index.

Insert Figure 7

The UK index of average earnings was taken as the labour price index, given the largely UK based composition of BA's employees. This rose by an average of 6.6% over the period, compared with BA's average staff remuneration per employee of 6.5%. Average UK prices rose by 4.9% over the period. Survival for BA therefore depended on producing labour productivity gains to allow real pay increases and generate adequate returns to capital and shareholders.

3.5 Labour/capital ratio

The capital/labour ratio was around 1.7:1 in 1982/83, but experienced a marked reduction to 1.3:1 by the date of privatisation. This was due to the shake out of labour, rather than any planned move towards increasing capital per employee. Once this had occurred, capital inputs tended to rise somewhat faster than labour inputs, with this ratio declining to 1.1:1 by 1996/97.

This suggests that BA, as with many other state-owned carriers, was overstaffed prior to the recovery measures initiated in the early 1980s. This is less likely the case now, although continued labour union power and restrictions in competition (eg BA's slot holdings at Heathrow Airport) suggests that some inefficiencies may remain.

⁴ BA's B757s increased from 4 in April 1993 to 41 in April 1997

A further lay-off of staff in early 1991 as a result of the Gulf War recession might have led to greater capital intensity, but capital was reduced more markedly in that year. This was the result of the withdrawal from all Irish and a number of other routes, and the retirement of seven BAC 1-11s and five Tristar 200s.

What emerges from this analysis is the fact that BA did not achieve any further substitution of capital for labour post-privatisation, even though labour wage rates increased very significantly in relation to capital prices. The extent to which this was possible in any large way in a service industry may have been limited, if the airline were to retain its reputation for high service standards. Some investment in automation led to reduced labour requirements. Examples of this were:

- The replacement of B747-100/200 aircraft which required a flight engineer with B747-400s which did not (from Summer 1989)
- Computerisation in areas such as accounts and management information which reduced staff needs

It is noteworthy that BA's Information Technology budget increased from £35 million in 1982/83, or 1.3% of turnover, to £130 million or 2.7% of turnover in 1989/90. This was expected to reach 5% of turnover in 1995 (British Airways, 1990). However, many IT or communications applications result in increased service quality rather than greater efficiency. One example of this is issuing passenger service staff with hand-held computers at check-in. It should be added that the air transport industry has been slow to adopt automation in areas such as check-in and ticketing, whereas other industries such as banking have developed faster. Some progress has been held up by the need for industry wide standardisation to be agreed (eg the Automated Ticket and Boarding pass, and electronic ticketing). This is because of the continued importance of interline sales.

3.6 Key factors in BA's recovery and above average financial performance

From the discussion above it was evident that labour productivity was the principal agent of BA's recovery, as well as its above average performance during the recession in the first half of the 1990s. Sterling's large fall, at least against the US dollar, also helped over the recovery period to 1984/85.

For the period as a whole, capital productivity by itself only contributed to the recovery between 1982/83 and 1984/85, and, for the rest of the period, growth in capital inputs exceeded output growth. This was partly because additions to capital tended to be aircraft of similar capabilities and size to existing aircraft. The benefits from these aircraft came from qualitative improvements, which could not be allowed for in the output index used in this paper. For example, more overhead locker space, improved seating, or lower cabin noise might have improved the yield from a similar volume of traffic. Non-aircraft investments which grew faster than aircraft investment after 1992 would also have given the airline a qualitative advantage.

However, capital investment also enables the airline's staff to be more productive. BA's total lease equivalent capital per employee increased in real terms from £5,100 in

1982/83 to £19,860 in 1996/97. This by itself would have been a major reason for the airline's success in increasing labour productivity, as described in 3.5 above.

Total factor productivity (the weighted average of labour and capital productivity) was shown in Figure 5 to have increased by just under 30% up to privatisation in early 1987. A further 30% advance occurred between 1991/92 and 1996/97, again driven by labour productivity achievements. BA's total factor productivity based on the above measures increased at an average rate of 3.4% a year between 1986 and 1995, compared with other research which estimated an identical rate for seven of the largest EU airlines over the same period (Oum & Yu, 1998). This is surprising, given that the same study reported a decline in TFP between 1990 and 1992 for the EU airlines, whereas BA was shown here to have increased productivity by 20% over these three years of recession.

The productivity of inputs other than labour and capital should also be mentioned, although this paper has not focused on these. Fuel and airport/ATC services are probably the two most important. The latter have increased in price substantially over the period, with little scope for increased efficiency, except by using larger aircraft, which was not the case. Fuel efficiency increased gradually over the period, as new aircraft were introduced. However, the fuel price declined significantly over both the first half of the 1980s and the 1990s largely taken as a whole. BA benefited from this in its pre-privatisation period, even after taking into account the weaker US\$ exchange rate. The same was the case in the early 1990s, although the exchange rate did not decline as much.

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Figure 7: BA Capital Prices Indices and Exchange Rate

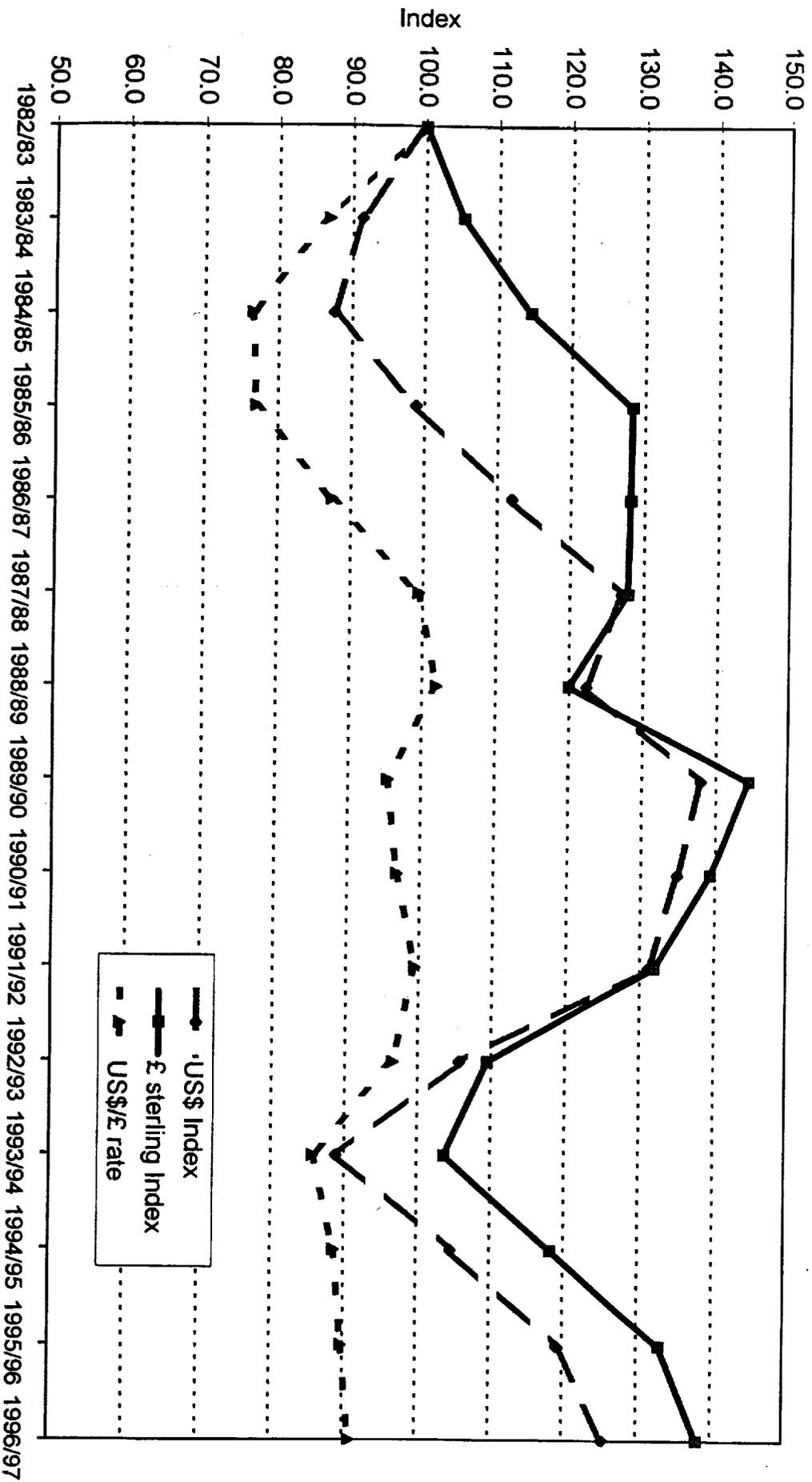


Figure 6: Input and Output Price Indices for BA (£)

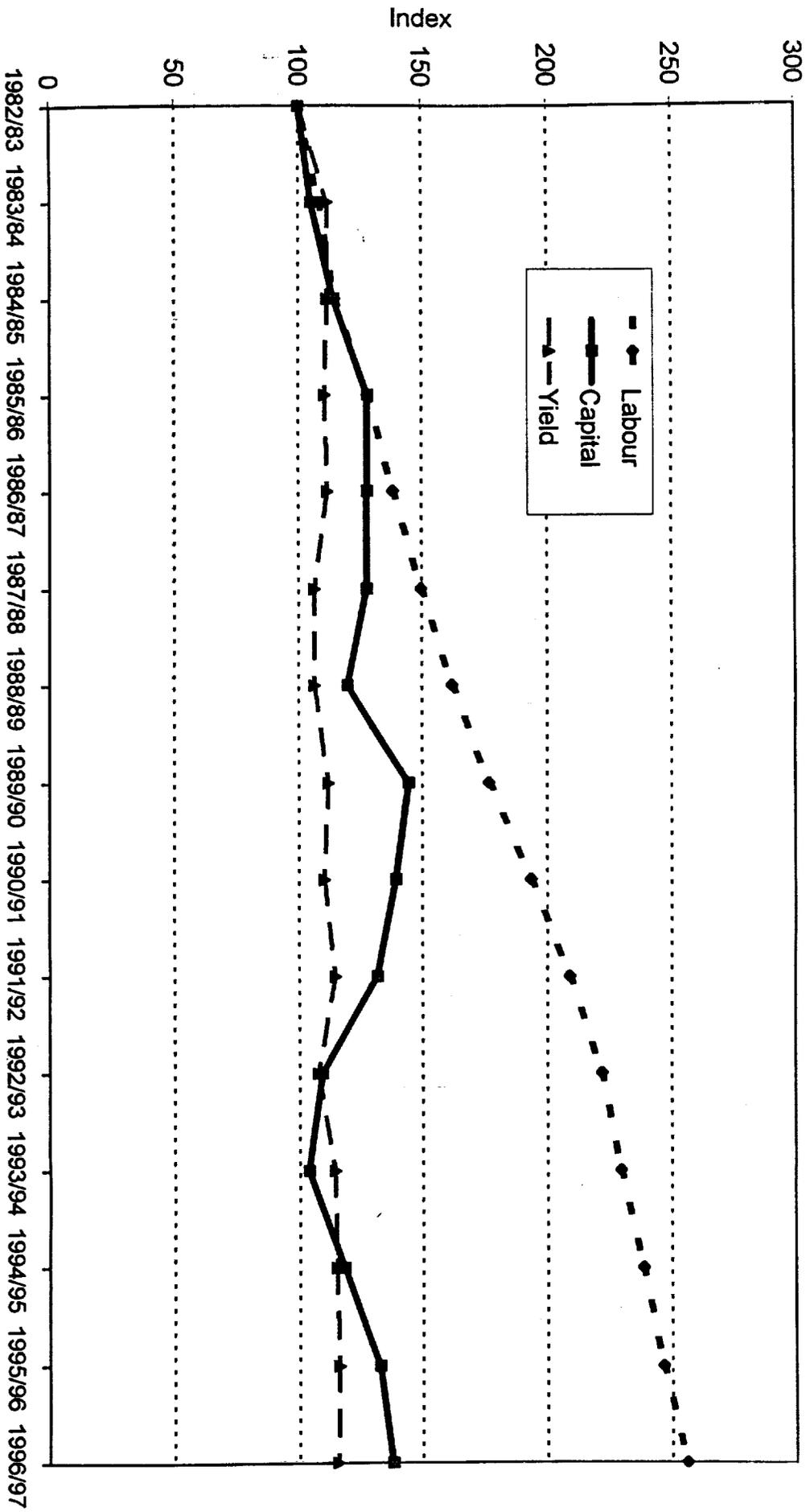


Figure 2: Traffic and Total Output for BA

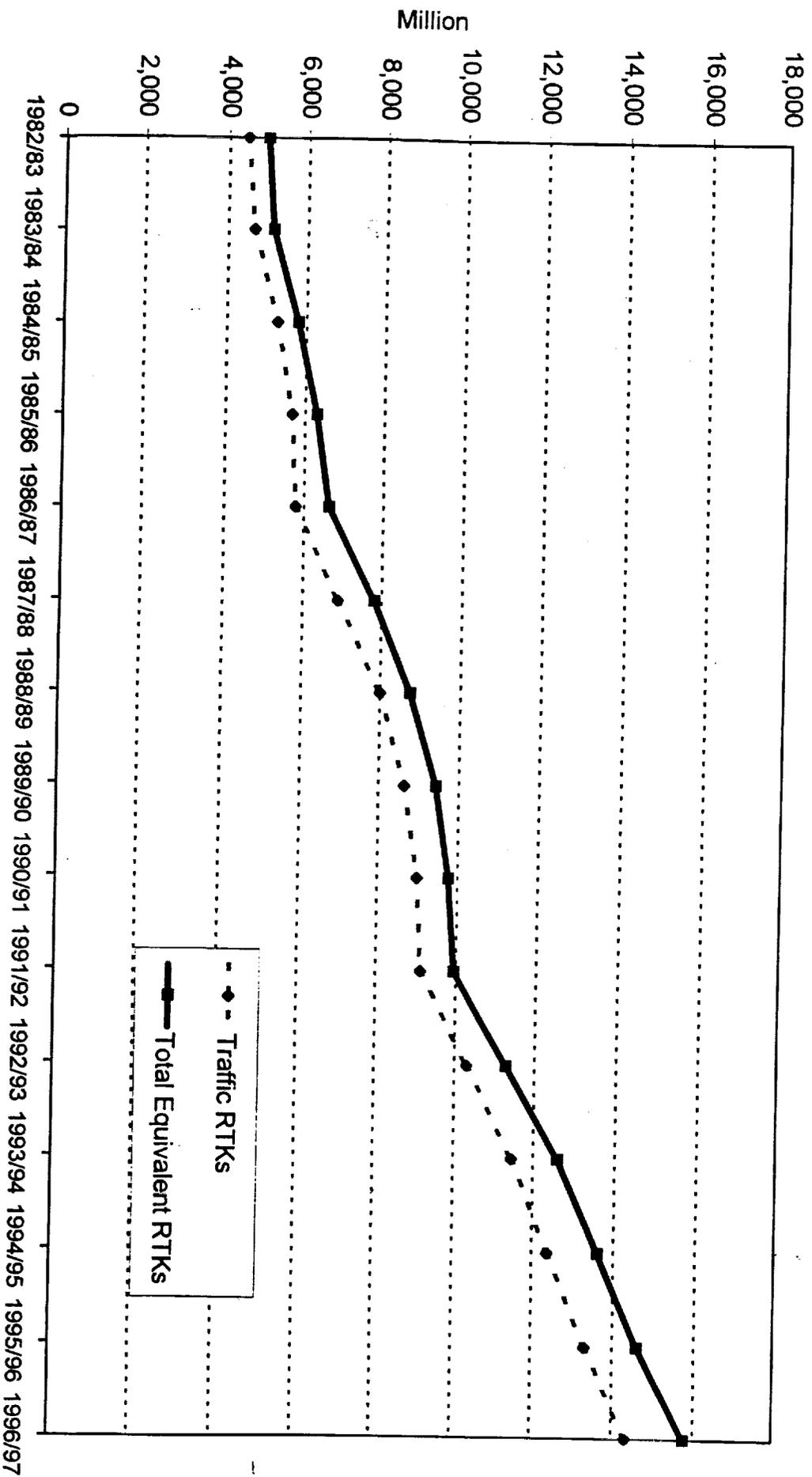


Chart2

BA Capital Trends and Productivity (UK Currency)

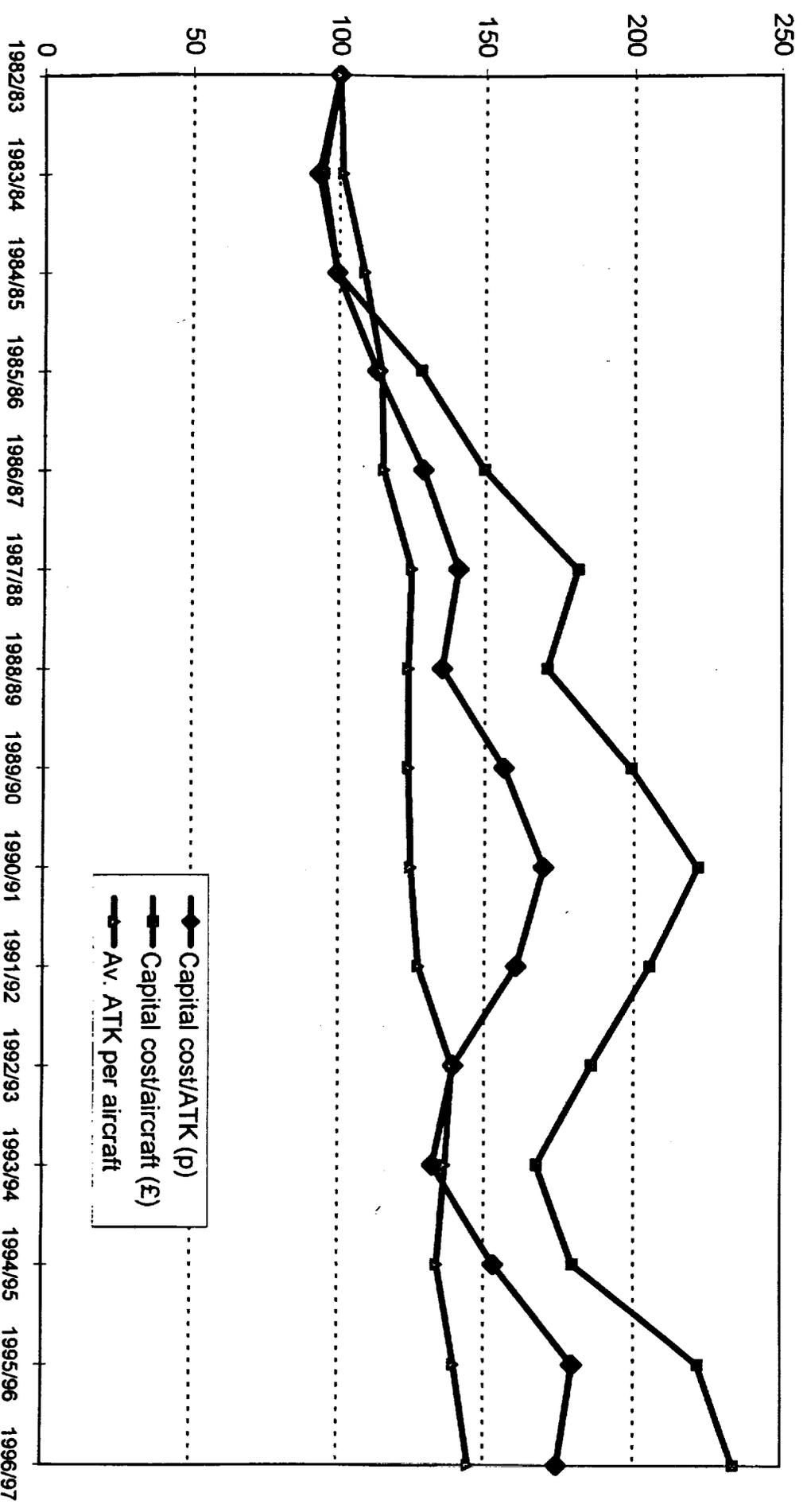


Figure 4: BA Aircraft Cost and Productivity Trends

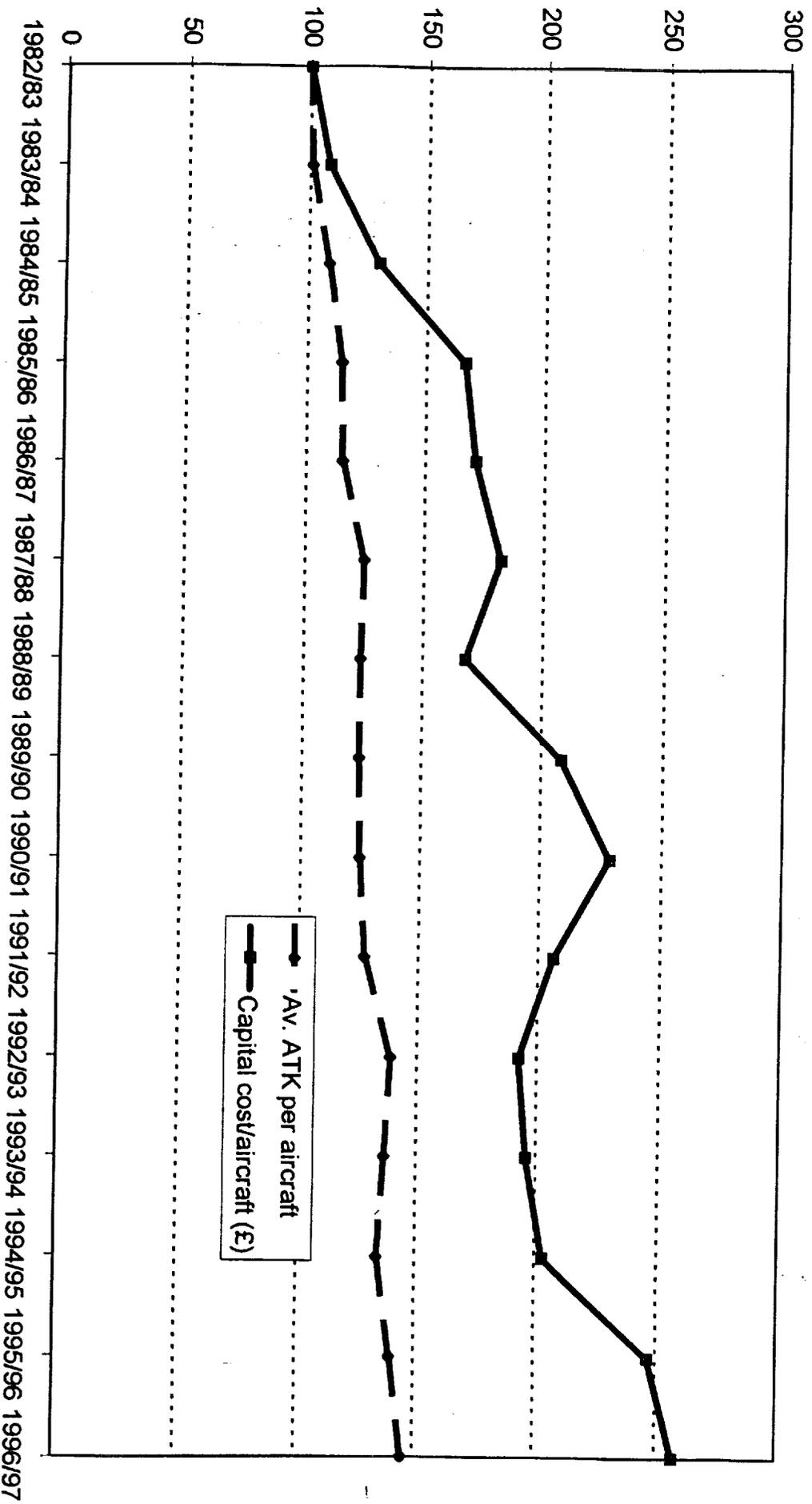
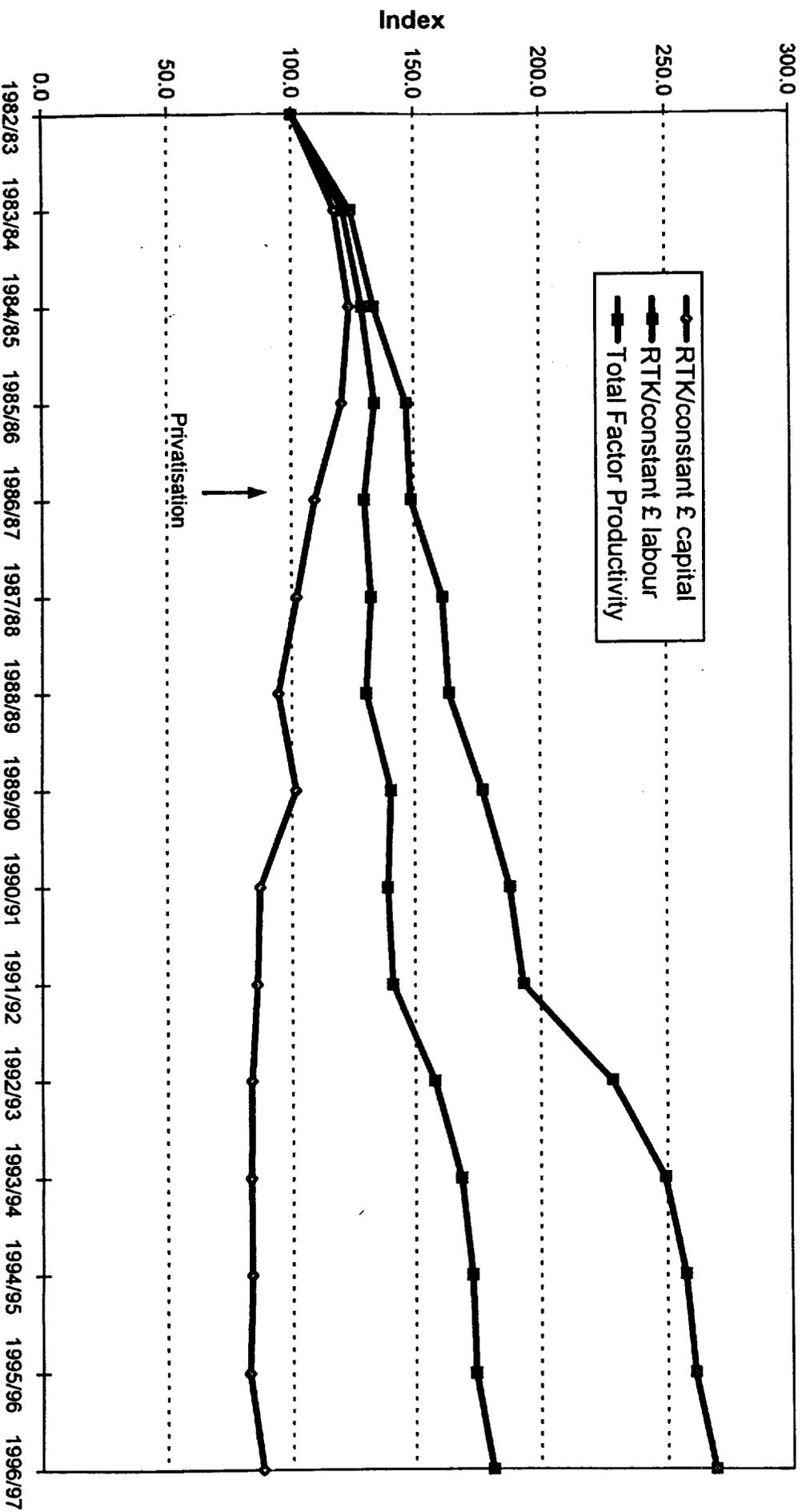


Figure 5: BA Capital and Labour Productivity



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AIRLINE PRIVATIZATION: DOES IT MATTER?

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AIRLINE PRIVATIZATION: DOES IT MATTER?

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The classic political argument over public enterprise has been whether the government should own businesses at all. Yet what matters more than titular ownership is how the enterprise is run, who makes the decisions, under what rules and subject to what political pressures ... Ownership does not necessarily give control; it may, in fact, affect the character of an industry very little (Corbett, 1965, p.185).

This paper reviews some of the issues concerned with the privatization of airlines within the EU and especially the implications (if any) of privatization for liberalization of the EU air transport market and for airline strategy. The questions broached include the following:

- (1) What does privatization mean?
- (2) What benefits are anticipated from privatization, and to whom will these benefits accrue?
- (3) What are the sources of pressure for and against privatization?
- (4) What are the implications of privatization for competition and for corporate strategy?
To what extent are the anticipated benefits compatible with each other?

Much airline privatization is current and it is too soon to say what its effects will be. I have therefore leaned heavily in one section on the best-known example - that of British Airways (BA) - to illustrate one tension in the privatization process. But the lessons of this case are limited, given the changes in regulation that have occurred since 1987 (the date of BA's privatization) as a result of the implementation of the three EU liberalization packages.

(1) What does privatization mean?

A broadly acceptable definition of privatization is that offered by E.S.Savas in his classic book on the subject: 'Privatization is the act of reducing the role of government, or increasing the role of the private sector, in an activity or in the ownership of assets' (Savas 1987, p.3). A key issue, then, is whether selling airlines reduces the role of government in air transport. Clearly, it does so in the direct production of services, but it may not do so in respect of overall responsibility for providing transportation.¹ 'Provision' continues and is even expanded in respect

¹ The distinction between "production" and "provision" is made in Kolderie (1990).

may be accompanied by close domestic and international regulation of routes and traffic.

Privatizing production of services involves several kinds of action. It might involve:

(a) an open offering of all or a majority of shares on the market without restriction as to categories of possible purchasers (as happened with BA in 1987);

(b) sale of all or a majority of assets to a single private sector buyer (the closest to such a case is the Belgian government's sale of 49 per cent of Sabena's shares to Swissair, with the government retaining a controlling interest). Some management buyouts would fall into this category;

(c) the buying back of government-held shares by an airline, as was proposed by KLM and the Dutch government in 1996 (Cramb, 1996).

(d) a process of reducing, without eliminating, public stakeholding, usually to below 50%. Such a process may occur in several stages and may (or may not) precede a complete sell-off of the public shareholding. Several European airlines have seen such a phased reduction over a number of years;

(e) a controlled, selective sale of shares to particular categories of buyers (such as financial houses, employees, and other airlines), often with specified proportions reserved for each category.

(2) What benefits are anticipated from privatization, and to whom will these benefits accrue?

Arguments for the privatization of airlines have closely resembled those applied to other industries. They involve both a critique of the performance, efficiency and accountability of state-owned carriers and, conversely, claims about the benefits for taxpayers, consumers, and the airlines expected to result, directly or indirectly, from privatization. The arguments for privatization of the airlines have, however, been offered in a particularly strenuous way by those who regard this industry (at least in Europe) as presenting an exceptionally egregious case of protectionism (domestic and foreign) in the face of those (a decreasingly vocal minority) who believe that airlines should stay under public ownership for reasons of national security and prestige and/or who see provision of air transport as a form of public service.

Benefits claimed from privatization include:

(A) For the taxpayer: The end of responsibility for capital injections, subsidies and accumulated debts, and a one-time windfall of revenue for the Exchequer from the sale of shares in the airline (with consequent benefits for government debts);

in the airline (with consequent benefits for government debts);

(B) For the consumer: Greater choice between carriers and lower fares as the result of the ending of state-mandated monopolies, better and possibly new services;

(C) For the airlines: (1) More efficient use of resources due to the pressures of a competitive environment and to their ability to pursue a commercially-based strategy, free of distracting and costly government requirements regarding such matters as routes, equipment purchase and employment levels; (2) Greater access to capital markets; (3) Greater freedom in purchasing equipment (including aircraft) and in controlling labor costs; (4) Greater scope for entering and creating alliances with other carriers (including non-EU carriers) and the possibility of selling their own equity and buying that of other airlines; (5) Greater opportunities for reorganizing management and hiring non-nationals.

These classes of possible beneficiaries demand further refinement. To whom and what does the category 'airlines' refer? The shareholders? The managers? The cabin crew? The ground staff? To what extent and how is each likely to benefit (if at all) from privatization? Does the answer depend on how privatization is carried out? Further, does what the Exchequer want differ from what some taxpayers want (and what other ministries want)? Finally, while not all taxpayers are consumers and not all consumers are by any means domestic taxpayers, is there some overlap between the categories and some scope therefore for both shared and conflicting interests?

Beneath these is the fundamental question: in what circumstances and for what purposes does ownership actually matter?

(3) What are the sources of pressure for and against privatization?

The whole political story of airline privatization in the airline is yet to be told. Both the advent of privatization and its widespread acceptance demand explanation, given the common view of the industry as a bastion of public ownership and protectionism.²

In seeking answers, we should distinguish three levels of economic and political pressure: the domestic; the European Union level; and the external - fashionably, the 'global' - level.

(a) The domestic level:

Public opinion: Though few polls have asked about airline ownership, early evidence from the UK suggested that voters 'regarded [public ownership] as a success' in the airline industry. More revealing, however, was that the percentage taking this view was only 35%: nine per cent

² Though, of course, private ownership of an industry and state protectionism are quite commonly associated.

regarded public ownership (of the-then BEA and BOAC) as "a failure" and a large majority (50%) were 'don't know's (Corbett, 1965, p.64).³ Party allegiance made surprisingly little difference to evaluation of the state airlines. This survey was, of course, taken at a time when, even more than now, air travel on scheduled services within Europe was almost exclusively the preserve of businessmen and government officials. If any consumer pressure for liberalization and privatization occurred, it was mostly to be found in the years after deregulation in the US and in the columns of such publications as *The Economist* and *The Financial Times*, both of which frequently and consistently protested about the costliness and arrogance of EU state carriers, drawing on a wealth of anecdotes from their suffering business (and political) readers.

However, while the need for privatization was a moral frequently drawn from such anecdotes, the main campaign was for market liberalization and against indulgence of state-owned carriers in such matters as subsidies, international route authorities and airport slots.

The attitudes of parties directly concerned with the industry - labour unions, airline managements, and ministers of transport and finance - have varied according to country, ideology and economic interest.

Labor unions: The left and labor unions have, predictably, been skeptical of privatization and its consequences. The resignation of Christian Blanc as chairman of the Air France Group arose directly from a disagreement with the Jospin government, elected in March 1997 (and particularly with the communist Minister of Transport, Jean-Claude Gayssot) over the proportion of Air France's shares to be sold directly on the market (Owen, 1997A; Jones, 1997A and B).

Yet the readiness of labor unions to accept both privatization and the restructuring invariably preceding it has varied significantly from one country to another. Compared to the unions in France and Italy, those in the more 'corporatist' cultures of Germany and the Netherlands (not to mention Portugal) have been relatively acquiescent. In 1992, the two major unions representing Lufthansa's workers 'signalled their broad acceptance' of a plan involving the elimination of 6,000 jobs (Fisher, 1992A). Airline officials commented that the concessions offered by the unions (notably the white-collar DAG) 'represented a marked change from the high wage demands' made even in the earlier months of the year (Fisher, 1992B).

In the case of KLM, the labor unions actually took the initiative in 1993 to suggest that the company expand its capital. A large number of meetings were held by management at KLM stations in the Netherlands and abroad to explain company strategy, while consultations were held with the Works Council on such items as 'investments and disinvestments....KLM's European

³ The survey, found that 'airlines, along with atomic energy, drew the largest percentage of "don't know" responses'. The railways and the coal industry were generally judged as failures of public ownership.

strategy...and the corporate culture.⁴

Airline managers: The most important tensions, and ambivalences, regarding privatization have clearly occurred at the level of airline management, in transport ministries and in relations between the two. Conflicts have occurred about the desirability of market liberalization and privatization. Largely because of pressures created by the single market (and indirectly by the European Commission), as well as by liberalization and alliances in markets outside the EU, airline managements have generally become favorable to (even anxious for) privatization.⁵ What they seek from privatization is greater flexibility in operations, procurement, hiring and firing, and financing. But they are concerned about the vulnerability to competition and even bankruptcy that go along with such flexibility.

The usual compromise has been to seek capital from the state to undertake the reorganizing and re-equipment that will enable a carrier to face competition within and outside Europe. But seeking such capital invariably attracts criticism of 'subsidies' from competing private carriers and from politicians and commentators hostile to the privileges - and even existence - of state-owned 'flag carriers.'

Airline managers also have to be sensitive about the terms on which privatization is implemented and about the regulatory conditions accompanying privatization. Airline managers resent the intervention of the state in policy matters such as equipment purchase and labor relations. But they expect state support in obtaining funds for restructuring before privatization and in various forms of debt relief (which may include low valuation of assets being transferred to the privatized firm, direct write-offs, and - what comes to the same thing - an actual return of some of the revenue from the sale). They may also hope that the terms of sale will not be affected by regulatory conditions intended to create a more level playing field between the ex-state airline and its private competitors.

The cases of Air France and British Airways illustrate some of the resulting ambiguities in relations between governments and airline managements.

French governments, of both the left and the right, have expected Air France to support various aspects of economic policy, notably preventing or reducing unemployment (including

⁴ KLM Royal Dutch Airlines (1996), p.28. In fairness, it should be noted that many other EU carriers have similar works councils, partly as a result of the relevant EU social policy directives.

⁵ Wright notes this as a general phenomenon: 'Perhaps the most serious dilution of support for the public sector is to be found among its managers. Indeed, by the mid-1980s they were among the principal proponents of the privatization movement' (Wright, 1994, 27-8).

unemployment in the French aerospace industry).⁶ When in 1991 Bernard Attali, as president of Air France, proposed cutting 3,000 jobs, he was immediately summoned by the Prime Minister, Edith Cresson (a Socialist, then facing an election campaign). According to Attali's vivid description:

The Prime Minister, beside herself, received me in the strange *boudoir* that served her then as an office. And [she] told me: 'This plan is stupid, I wasn't told about it, I'm going to have to stop all this. That's an order' (Attali, 1994, p.110: my translation)

The subsequent conservative government of Edouard Balladur initially supported Attali's reforms, through its transport minister Bernard Bosson, and included Air France in its list of companies for privatization. But it was facing 12.2% unemployment and (despite defiant public rhetoric from Bosson), the Air France management was told privately that there should be a minimum of layoffs at Air France (as at other state corporations). When the ground staff carried out a highly-publicized and damaging strike in October 1993, Bosson backed down, withdrawing Attali's plan and subsequently claiming to have done so on the direct orders of Balladur, who 'would countenance only a "few dozen layoffs,"' rather than the 800 envisaged (*Financial Times*, 1993B).

Explaining his subsequent resignation, Attali remarked:

The state [had] involved itself in a bungling fashion in the management of a large enterprise. Through lack of *sang-froid* it stopped point-blank, at the worst moment, a process of modernization [which was] certainly painful, but indispensable (Attali, 1994, p.227: my translation).

Attali's successor, Christian Blanc, expressed similar frustration in January 1997, some months before his own resignation. In this case, one cause seems to have been pressure on Air France to buy Airbus A340s rather than Boeing 777s. The transport minister, Bernard Pons, told the National Assembly that the airline's choice would depend 'not only on the interests of .. Air France but also [on] the interests of the other economic sectors of our country' (Owen, 1996). Though his ministry subsequently denied any intention of pressing Air France to buy Airbus aircraft, it commented that there might be 'a difficult reaction' if the airline bought only Boeings (Owen, 1996). In his January speech, Blanc declared:

The state is the owner of Air France, SNCF, Aeroports de Paris and Aerospatiale. In short, it is constantly judge and party to the case. It interferes in everything, seeking compromises everywhere to minimize risks but having absolutely no strategy (*Air Transport World*, 1997A).

⁶ For a good summary of relations between French governments and Air France, see Kassim (1996), pp.121-2.

However, while critical of the government's 'meddling', Attali and other Air France officials were at one with their political superiors in being skeptical about liberalization. The Air France management, while desiring greater operational independence, does not seem to have pressed for open skies agreements and was critical of both the European Commission and the more aggressively liberal Member States and airlines. It wanted to maintain state involvement in international regulation (and thereby the airline's privileges as a flag-carrying 'national champion') and state sponsorship in obtaining EU agreement to subsidies. But it was less etatiste when it came to exercising its managerial prerogatives in the autumn of 1996

The privatization of British Airways in the mid-1980s revealed a similar tension between a desire for freedom from government control and a wish to keep the status of 'national champion.' Responding to efforts by its domestic rivals (notably British Caledonian) to reduce BA's market dominance before privatization, BA's management, led ferociously by Lord King, launched an intensive campaign asserting that Britain 'needed the strongest possible flag-carrier, to make sure UK civil aviation went to the top of the world league and stayed there' (Campbell-Smith, 1986, p.152). The campaign claimed that 'every day British Airways compete[d] with hundreds of foreign airlines from all over the world' (Campbell-Smith, 1986, p.156).

BA's critics retorted that such flag-waving was disingenuous and irrelevant. The real issue was the virtual absence of competition with other UK airlines on long-distance routes and BA's efforts to resist erosion of its dominant position within Europe and the UK itself. BA might be battling it out around the globe with foreign airlines; but no other UK airline was allowed to compete with it at Heathrow.

Government officials: Undoubtedly, Leonard Hill was largely correct when he wrote in 1997 that

airline privatization efforts continue, in direct proportion to the desperation of governments to replenish depleted national coffers. Wherever a country's national identity isn't inextricably meshed with having an airline as a projection of sovereign power ... politicians appear eager to unload their prestigious crown (read 'airline') jewels (Hill, 1997).

What, apart from the desire to offload expensive state carriers, shaped the attitudes of government officials to privatization? Why had airlines, so long a traveling symbol of nationhood (and in some areas of modernity) become more dubious assets in the eyes of their principal shareholders? Why were the crown jewels so tarnished?

Much of the explanation certainly lay beyond the industry itself, in the broader ideological movement that, starting in the seventies, expressed skepticism about the efficacy and benefits of statism and sought to enlist the dynamism of markets and entrepreneurship. As Vincent Wright remarks, privatization was "part of a wider package of reducing the size and reshaping the role of the central state, of allocating resources and wealth differently, and of providing collective goods in a different fashion" (Wright, 1994, p.6).

But the impact of this ideological movement has been greater in some Member States than in others. The British case is the clearest example of ideology as a positive and basic source of motivation (as distinct from budgetary retrenchment, pressures from airline managements, from Brussels, and international liberalization and alliance-building). Yet under Thatcher, privatization was not initially a priority item and a firm commitment to the sale of BA shares did not occur until January 1986 (Richardson, 1994, p.63; Campbell-Smith, 1986, pp.115-6). Moreover, the positive philosophical virtues of privatization were inextricably mixed with more practical concerns regarding the government's finances. One motive for privatization arose from the Treasury's unhappiness with a proposal to 'unlink' nationalized industries from the Public Sector Borrowing Requirement (PSBR), allowing them to raise finance privately. Gradually, the notion spread that (in Campbell-Smith's words), 'the best solution was to go the whole hog: if private capital financing was so desirable, why not push the putative borrowers back into the private sector altogether?' (Campbell-Smith, 1986, p.117).⁷ Proceeds from sales of state industries would also provide one-time windfalls of money for the Exchequer.

Other benefits claimed for privatization in the UK included the more efficient use of resources, the promotion of competition, and the creation of a share-owning democracy (including ownership by employees). Not all the objectives of privatization were necessarily consistent (for example, as discussed below, the objective of maximising revenue from the sale of an industry might be in contradiction with the objective of encouraging competition - a relevant concern in the sale of state airlines which were legal or *de facto* monopolies).

On the Continent, airline privatization had gone farthest in the Netherlands, but in few countries did it attract the ideological fervor that surrounded it in Thatcher's Britain. In many countries, the Christian Democratic tradition placed more importance on the concept of the 'social market' and was skeptical about its more ruthless Anglo-Saxon counterpart (Wright, 1994, p.16). Even in France, where significant privatization occurred over more than a decade, the socialist and statist tradition remained strong, including in policy toward Air France. Though leaders of the French independent airlines called for the privatization of Air France, others (such as Senator Ernest Cartigny, chair of a parliamentary committee on the airline industry) and Bernard Bosson, the transport minister, opposed such a change. Bosson explicitly attacked 'ultraliberalism':

The EU is not simply a zone of free trade, having for its only value the laws of the market. The EU must also include a social vision, the values of regional development and public service, which are ignored by considerations of profitability (Ridding and Betts, 1994).

Nevertheless, the French government subsequently decided to move toward privatization. In this

⁷ This sentiment seems to have been reciprocated by the 'putative borrowers': Richardson notes that in Britain the 'tightening of financial control [by the government] had the effect of edging the industries' managers towards a recognition that the only way to avoid the new irksome burdens was to escape the public sector altogether' (Richardson, 1994, p.60).

and other cases, the key question is how privatization is implemented. The formulas under consideration reflect a range of political and economic objectives and constraints, some of which have little to do directly with maximising returns from a sale. Their rationale will be clearer in the context of pressures on the owners and managers of airlines from the creation of the single market and from broader trends in deregulation and corporate strategy in international air transport.

(b) The EU level:

In February 1994, a report by a group of European aviation experts, called the Committee of Wise Men, recommended to the European Commission that approval of state aid for national airlines 'should be contingent on a company being privatized' (Dixon, 1994). Commission officials pointed out, correctly, that they could not 'formally tie aid to privatisation': Article 222 of the EC treaty specifically stipulates that the Treaty 'shall in no way prejudice the rules in Member States governing the system of property ownership.'⁸ Commission officials are sometimes careful to deny any wish to impose privatization on governments.⁹ Yet the fact is that in some cases they have, as Hugo Dixon observed, applied 'a premium to privatisation'

because the fact that a company is being prepared for privatisation enhances the credibility of its restructuring plan. It is also the best guarantee that subsidies are being provided for the last time (Dixon, 1994).¹⁰

The philosophy of the single market and the impact of specific legislation did create a climate in which the distancing of government from business was and is a premise or an expectation. This climate strengthens those advocating privatization and puts those opposed to, or skeptical about it, on the defensive. Basic EU law and specific directives 'logically prevent dirigiste governments from fully exploiting their public enterprises as instruments of industrial, regional policy or of purely political patronage' (Wright, 1994, p.4). They also deprive state-

⁸ Though David Allen, in a discussion of competition policy, notes that a policy review in 1989 'drew attention to the Commission's interest in using the treaty provisions both to police and further to encourage the processes of liberalization *and privatization*' (Allen, 1996, p.178: my italics).

⁹ For example, in July 1994, it was reported that a condition for the Commission's approval of a FF20 bn. aid package for Air France was that "the restructuring of the company should be followed by privatization" (Tucker and Ridding, 1994). Shortly afterwards, the Transport Commissioner, Marcelino Oreja, issued a clarification stressing that the EU was "not specifically requesting Air France's privatization ... This [he added] is the French government's voluntary commitment" (Sparaco, 1994).

¹⁰ Dixon pointed out that pledges to privatize (or to involve private capital) were significant in the EU's agreement to subsidies for state-owned steel companies in Germany, Italy and Spain.

owned companies of virtually all the privileges they have previously enjoyed and, conversely, draw unflattering attention to their costliness and lack of accountability.¹¹

Public enterprises are expected to comply with all the rules that apply to comparable private businesses. They potentially face challenges under Articles 85, 86 and 92-4 (dealing, respectively, with distortion of competition, abuse of dominant position, and state aids). They may not receive injections of capital from the state unless it can be shown that a private investor would make a similar investment applying conventional business criteria. Other forms of state aid are subject to specific criteria: subsidies for services within the category of Public Service Obligations must be clearly separated from normal commercial operations, be transparent in their accounting, and be subject to competitive bidding. Increasingly, state airlines have been denied monopoly or preferential rights in use of airport services.

The three liberalization packages have removed the other privileges of state carriers, while leaving Member States responsible for licensing of airlines and other regulatory functions. With cabotage open to all Community carriers, state airlines can no longer enjoy domestic monopolies, while the rights they held under bilateral agreements with other European states have disappeared.

So the question - for governments and managers alike - must be, 'What is the point of state ownership now?'

Governments may still want the right to commandeer airliners in military and other emergencies (and may fear such aircraft and their owners coming under foreign control). But (as discussed below) licensing and aircraft registration procedures provide protection against control by non-EU nationals. Moreover, during recent crises, obtaining civil airliners for military purposes does not seem to have been difficult (and governments have, or can easily adopt, emergency legislation to require private carriers to make aircraft available).

Support of national aerospace industries - a traditional and much resented function of state airlines - now has less political weight. Apart from Airbus Industrie, no European aerospace company offers a significant challenge to Boeing, though ATR and British Aerospace build a range of turboprops. British Airways has long since liberated itself from government influence in selection of aircraft. Air France and Lufthansa have certainly been under pressure to buy from Airbus and have done so extensively. Indeed, in the case of Lufthansa, further privatization was opposed by the state of Bavaria in the mid-eighties, reportedly because the Minister President, Franz Josef Strauss (who was at the time chairman of the board of Airbus Industrie) feared that Bavaria's substantial stake in aerospace (including the Airbus consortium) might be undermined if Lufthansa's management were free to order aircraft solely according to their commercial judgement (Esser, 1994, pp. 113-4).

¹¹ The increasing cost of acquiring up-to-date aircraft is not the least important factor motivating governments to privatize airlines.

Where airlines do stay in public ownership, it will be because of a continuing belief that air transport is best provided as a public service, for reasons of prestige or diplomacy, because of direct political pressure by unions and others against privatization, or (not least) because prospective buyers or shareholders are unlikely to be interested or are unwilling to pay what governments regard as a reasonable price.

The financial and political pressures for privatization are, however, substantial, and have been especially so in the run-up to establishment of the European Monetary Union. For example, France's choices regarding privatization have depended to a great extent on what contribution a particular sale would make to lowering the government's debts. The French government preferred to sell 20 per cent of France Telecom rather than Air France because the former sale was expected to bring in \$6.6 billion:

Air France's privatization [an official noted] would have generated much less cash. Politically, the carrier's proposed privatization was not worth a serious political incident (Sparaco, 1997A).

Indeed - so far from being a source of revenue - Air France benefitted directly from privatization elsewhere in the economy. Thus in March 1994 the government announced that it would privatize Assurances Generales de France because 'it needed the money to pump into Air France' (*New York Times*, 1994).¹²

Concern about EMU has affected other governments. Though the Netherlands was not expected to face a serious problem meeting the convergence criteria, one of the reasons cited for an early (and in some eyes premature) sell-back of KLM shares by the Dutch government was that the latter was 'anxious to bring down debt ahead of European monetary union' (Cramb, 1996).¹³

For Italy, which did have a serious deficit problem and was most anxious to be accepted into EMU, the issue of admission became entangled diplomatically with the apparently more commercial issues of privatization and strategic alliances. In 1996-97, it was well known that KLM was looking for a European partner to strengthen its weak market share within the EU. KLM decided that it needed a southern European hub and began negotiations with Alitalia, which was emerging from a very difficult period and was outside the major international alliances.

But in February 1997, Alitalia concluded a marketing alliance with Air France. One correspondent speculated that 'Romano Prodi's government might opt for a "political deal" with

¹² The Minister for Industry, Gerard Longuet, remarked, 'We need a bit more money because Christian Blanc's report shows that you can't get something for nothing. We're selling one asset to rebuild another' (*New York Times*, 1994).

¹³ Under the convergence rules, revenue from privatizations was not supposed to be used to reduce overall deficits but it was very useful in reducing debt levels.

Air France to underpin the Franco-Italian relationship in the final stages of Italy's bid to enter a single currency' (Blitz, 1997B). But the very political character of such an alliance would weaken prospects for privatization of Alitalia in 1998: 'If we are to start selling shares next year [a senior official remarked], we need a deal that is perceived to be good sense on a technical and commercial level, not a political one' (Blitz, 1997A).

While Air France's management wanted to end the carrier's isolation, Alitalia's management clearly believed that an alliance with KLM would make better commercial and technical sense and that prospective share-buyers would take the same view. Also, KLM was already more than 60 per cent privately-owned, while Air France was still entirely government-owned (and, moreover, had recently lost a much-respected chairman, Christian Blanc, precisely over the issue of privatization).¹⁴ Alitalia's management finally persuaded Prodi that an alliance with Air France 'would undermine plans to privatize the Italian airline' and a deal was struck with KLM, 'in spite of pressure from the French government' (Blitz, 1997B; Owen, 1997B).

To summarize the impact of the single market on state ownership: while nothing in EU legislation requires or explicitly encourages privatization, the premise of the market is competition to ensure the efficient use of resources. 'In principle [as Redor notes], private and public enterprises (in the competitive sector) are subject to the same rules and are supposed to behave in the same way.' The EU has adopted a notion of 'neutrality' as between public and private firms so that over time 'the difference between private and public firms in the competitive sector will become increasingly less' (Redor, 1992, p.162).

But - contrary to the common view that the effects of the single market will be gradual and evolutionary - the impact on publicly-owned firms may be immediate and dramatic. The impact has certainly been dramatic in the case of air transport. The onus has shifted onto the shoulders of the supporters of public ownership to defend its utility, against the default position that, absent a positive case to the contrary, the norm is and should be private ownership.

To follow the actual change in discourse on this subject, the key group to study is probably the airline managers (rather than government officials). They are the people most directly affected by the dynamics of change and they find themselves caught between their political masters and the pressures of the market. Shifts in discourse may occur under one management team, but they more commonly occur with a change in leadership (as when Lord King and Colin Marshall were appointed to head BA, possibly when Christian Blanc was appointed as chairman of Air France, and by successive changes at Alitalia, Iberia, and TAP). Equally significant is the trend toward the appointment of Americans to management positions in

¹⁴ *The Financial Times* reported that 'recent ructions over the [Air France] group's privatisation, which culminated in Mr. Blanc's departure, may have handicapped its attempts to forge a link with Alitalia by clouding aspects of long-term strategy' (Owen, 1997B).

European airlines (and a general internationalization of managerial recruitment in the industry).¹⁵

(c) The external or 'global' level:

Such changes in personnel reflect the changing nature of the industry. Despite an archaic regulatory regime still formally governing international aviation, increasingly comprehensive alliances have formed between major carriers. These alliances have the effect of by-passing some of the restrictions imposed by the international regime and some aspects of domestic regulation.

The internationalization of an industry that is itself a primary vehicle of internationalization creates a special problem for publicly-owned carriers. As Stevens has said ,

the dilemma facing state-owned enterprises is that the pressure to internationalise their activities is growing rapidly, but that the corporate strategies needed to respond adequately are ultimately best pursued in a privatised context (Stevens, 1992, p.17)

State-owned airlines are at a disadvantage in joining the new alliances (even if they can do so legally) because private firms may be reluctant to accept them. Public enterprises are apt to have legally-mandated missions which may be at odds with the strategies of private firms. They are subject to being tools of government employment and industrial policies and to being influenced by political parties, labour unions, and regional pressure groups. In short, they can be awkward partners, distracted by politics, over-bureaucratized, and lacking in flexibility.¹⁶

Certainly, those airlines which are entirely or almost entirely state-owned have been the slowest to form or to join international alliances. The pioneers in transatlantic alliance-making were KLM, British Airways, and Lufthansa (in which the state held only 36% of shares in 1995 and which was scheduled for complete privatization in 1997). SAS (50% state-owned) had a range of overseas investments and eventually became a partner in the United-Lufthansa-led Star Alliance. Delta's original European partners - Sabena and Swissair - have either a bare majority or a minority government holding. By contrast, Air France, Alitalia, Iberia, TAP, Olympic, and Aer Lingus have been late to join the alliance game and only Iberia has made significant foreign investments (which have been criticized as more political than commercial in motivation).

In the case of Air France, a major reason for Christian Blanc's frustration and ultimate

¹⁵ On the internationalization of airline management, see Flint and Donoghue, 1997, and Jones, 1997C.

¹⁶ Another reason for the reluctance of private firms to become involved with public companies arises from a concern that while state-owned companies may be allowed to buy equity in private businesses abroad, such businesses cannot buy equity in totally state-owned companies or may be limited in the proportion they may buy. For this reason, state-owned companies may be seen as predatory (Wright, 1994, p.4)

resignation was that he saw serious privatization as essential to making the airline an acceptable and attractive partner in alliances with privately-owned airlines (American or otherwise) (Jones, 1997B). Without such alliances, Air France would, he predicted, quickly become isolated. In his resignation statement, Blanc declared that privatization was necessary for the development of Air France:

In the ruthlessly competitive battle among airlines worldwide, the clocks are ticking away. There is no time to lose. It is precisely on this crucial point, the pace of our development, that there is disagreement with the shareholder [i.e., the government] (Owen, 1997A).

Even when Air France subsequently signed marketing agreements with Delta and Continental, the aviation media agreed that, as *Airline Business* remarked, neither American carrier would 'feel comfortable getting closely involved with a state-owned airline unless they [sic] know that privatization is around the corner' (*Airline Business*, 1997; Jones, 1997B).

The managements of KLM, Alitalia, and Lufthansa also saw further privatization as a condition for external alliances. Regarding KLM's 1996 proposal to buy back shares from the Dutch government, a *Financial Times* correspondent commented: 'A deal could also aid KLM's image in the eyes of potential industry partners which, in countries like the US, may be less keen on an alliance with a carrier seen as a semi-state enterprise' (Cramb, 1996).

The German case was more complex. The German government wanted to strengthen Lufthansa, through internal restructuring and creating an alliance with a US carrier. Although an alliance with United was established in October 1993, its full benefits depended on anti-trust immunity being granted by the US government, the price for which was an 'open skies' agreement between Germany and the US. Lufthansa, under pressure to recover traffic lost to KLM after the Dutch 'open skies' agreement with the US in 1992, lobbied strenuously for an 'open skies' agreement, against some officials in the Ministry of Transport. Once such an agreement had been signed, anti-trust immunity was granted: the alliance went ahead, and complete privatization was approved. In this instance, then, privatization was indirectly linked to market liberalization outside the EU, as a result of a government strategy to prepare an airline for privatization.

(4) What are the implications of privatization for competition and for corporate strategy? To what extent are the anticipated benefits compatible with each other?

The formation of competing international airline alliances, accompanied by some liberalization of global air transport, has thus compounded the pressure arising from liberalization within the EU to encourage privatization. For airline managers, the balance of advantage for competitive success has swung away from public toward private ownership. In arguing for privatization, management is usually pushing against an open door. Most governments are anxious to reduce their debts and are happy to see the responsibility for raising capital transferred to the market (and responsibility for dealing with unions transferred to private managers).

For whom and for what, then, does privatization matter?

Clearly, it matters for most governments (and especially their finance ministers): for them, its impact is positive, though (ironically) it may increase their regulatory responsibilities. It matters for airline managers as a way of increasing access to capital markets, increasing commercial and operational flexibility, and expanding opportunities for alliances with, and takeovers of, other airlines. It matters for the internal structures of companies and may lead to more efficient use of resources. It matters for airline employees, who will be faced with the insecurities and opportunities of working in organizations coping with the rigors of competitive markets and the rhythms of the economy. It matters for individual and institutional shareholders and for the financial institutions and suppliers on whom the airlines depend and with which they share risks.

But does it matter for the consumer? Will privatization necessarily lead to greater competition, greater innovation, improvement in service, and lower fares? How will the impact of privatization in this sector differ from that in others?

In the concluding section of this paper, we examine three factors that may affect the impact of privatization. They are, first, procedures for privatization; secondly, the existing level and type of competition; and, thirdly, the regulatory framework.

(a) Procedures for privatization:

As noted above, 'privatization' covers a wide range of government divestment. It may involve a reduction which still leaves the state with a substantial or even a majority shareholding (as in the government's proposal for Air France, and the present situations of Sabena and Alitalia). In several cases, however, (such as TAP and Finnair) the governments' intention is to substantially reduce their holdings, retaining a 'golden share' of less than 30% (in TAP's case, only 10-15%). Others envisage complete divestment (as occurred last autumn with Lufthansa).

Procedure for privatization may include reserving specified proportions of shares for airline employees. It may involve a mixed offering to identified financial or industrial institutions and to the public (as seems to be intended for Iberia). Privatization may also allow for purchase of equity by other airlines (subject to important restrictions). The best-known case is Swissair's purchase of 49.5% of Sabena, but more recently Iberia has announced that BA and American Airlines will each buy five per cent of its stock, and the Spanish government has reportedly considered a plan that would give BA and AA a controlling interest in Iberia (Burns, 1997). Such a proposal raises a serious regulatory issue (discussed below) which has led many airlines to restrict purchase of stock by foreign companies and individuals.

(b) Competition issues:

Although increased competition is often assumed to be one of the beneficial outcomes of privatization, it may in fact have no impact on the level of competition. As Martin and Parker

have noted,

privatization may have no effect on competition. Monopolies might be sold-off with their monopoly powers wholly or largely intact while many state-owned firms have traditionally operated in competitive markets... conceptually, the impact of ownership and competition (in the product market) are quite distinct, and while the positive effect of competition on performance is a relatively uncontroversial one in economic theory, the impact of ownership per se is much less well-determined (Martin and Parker, 1997, p.8).

In the EU, both Commission competition policy and Member State privatization policies have (by contrast with deregulation in the US) been reticent about breaking up companies in dominant positions or preventing mergers that might create monopolies (Majone, 1996, p.19).¹⁷ Moreover, the promotion of competition may have lower priority with Member State governments than some other benefits. Indeed, it may actually conflict with other objectives of privatization..

In the European airline industry, the earliest and best-documented case was that of the privatization of British Airways. Its motivation and implementation resemble current efforts, although it occurred in a regulatory environment markedly different from that of the current privatizations - that is, before the full establishment of the single market and the complete liberalization of air transport.

As noted above, BA's rivals argued that to privatize the state airline without reducing its network, or breaking it up into several companies (a la AT&T), would simply turn a public near-monopoly into a private real monopoly. The leading government spokesman on privatization had said:

The long term success of the privatisation programme will stand or fall by the extent to which it maximises competition. If competition cannot be achieved, an historic opportunity will have been lost (John Moore, M.P., quoted in Campbell-Smith, 1986, p.121).

But, as Campbell-Smith observes, the government had put itself in a difficult position by announcing the sale of BA 'before so much as starting to think about the regulatory aspect' (Campbell-Smith, 1986, p.122). It could have used the prospect of privatization to enact legislation protecting the competition it claimed to support. Instead, it became a hostage to those (including the Treasury and the management of BA) who wanted a quick and profitable privatization, which (they argued) depended on keeping BA as one unit with all the assets it currently held.

¹⁷ While it is limited by Article 222 from questioning changes in property relations, the Commission has required the dropping of routes in certain merger cases and could investigate at any point charges of potential or actual abuse of dominant position by an airline, whether state-owned or private.

The financial interests of the government, those handling the sale, and BA itself were thus at odds with those of a regulatory policy designed to promote competition. The independent airlines pointed out that BA controlled roughly 83% of UK domestic services, a high proportion of services to the Continent, and all long-haul services by UK carriers from Heathrow. To allow it to pass into privatization without reducing its competitive advantage would lead directly and inevitably to a stifling of competition.

But, caught between the advice of its own regulatory agency, the CAA (which recommended heavy pruning of BA's network before sale), and those who on grounds of nationalism and profit wanted BA sold intact, the government opted for a minimal reduction of BA's network (Campbell-Smith, 1986, p.168).¹⁸ Shortly afterwards, BA absorbed British Caledonian and went on to take over or turn into franchisees a number of the independents, notably Dan-Air.¹⁹

To what extent is the experience of privatization in the UK a precedent for what may happen as a result of the present wave of privatizations in the EU? One similarity is that none of the government's proposing privatization has indicated an intention to break up or reduce the assets of a national airline before sale. The European Commission has questioned mergers, alliances and subsidies involving, one way or another, nearly all of the national carriers, but it has not raised regulatory issues about privatizations. The fact that privatization is a property issue and does not directly entail a change in markets across borders adequately explains its silence.

But it (in common with Member States) would presumably argue that creation of the single market, with its accompanying liberalization of air transport, provides a radically different context from that of the mid-eighties. All routes within the EU are in principle 'contestable', which was certainly not true in 1987. Competitors can now invoke the entire apparatus of EU law to challenge mergers or abuses of dominant positions, while the era of large government subsidies to state carriers is clearly over. Many state airlines - even before privatization - are already being faced with direct competition on both domestic and intra-EU routes.

Yet it is also clear that some airlines undergoing privatization are seeking the kind of consolidation in their domestic markets that BA sought and that is a normal defensive move when

¹⁸ Specifically, the CAA recommended that BA be required to give up all its European services from British provincial cities, all scheduled operations from Gatwick, and three long-distance routes.

¹⁹ British practice was generally 'to keep the industries with their present form of organization (that is, they were generally not broken up), and essentially to turn public monopolies into private monopolies, with occasionally more competition at the edges.' As Richardson notes, 'The short-run benefits of getting the institutions out of the public sector and getting the revenue into the Exchequer were more important than the long-term aim of increasing competition and efficiency' (Richardson, 1994, p.67).

faced with challenge from abroad (and/or preparing to expand abroad). Moreover, the creation of global strategic alliances (in which virtually all EU national airlines are now involved) will lead to further concentration at hubs in capitals, favoring carriers which have slots and gates at these airports. To the extent that privatization enables major EU carriers to join alliances, it may contribute to a concentration of the airline industry in Europe - especially if these carriers succeed in incorporating regional and domestic carriers into their networks. To this extent, Wright may be correct when he concludes that 'privatization may be seen as a mechanism for facilitating rationalization processes already at work in the national, European and international economies' (Wright, 1994, p.34). Whether existing independent airlines and start-ups survive and prosper will depend (as under US deregulation) on skill in identifying promising markets and self-restraint in not over-expanding, as well as on the ability of the larger carriers to reduce costs and match prices.

(c) The regulatory framework:

Privatization does not imply by any means a withdrawal of the state from involvement in commercial aviation. Indeed, as Majone has pointed out, a general paradox is that the retreat of public ownership has been accompanied by the advance of 'the regulatory state.' The European Commission has already produced a substantial body of rules intended to protect competition and the interests of consumers in this industry. However, under the principle of subsidiarity, much of the burden of regulation will fall on agencies in Member States, and the resources and experience of these bodies vary considerably (Cameron, 1998).

Indeed, the degree of regulatory authority kept by Member States may impede the process of 'rationalization' or 'concentration' that Wright and others see as a probable and necessary consequence of privatization. Although the EU market has been liberalized, international air transport outside the EU is still regulated by the Chicago Convention of 1944, which provided for regulation through bilateral agreements between states. These agreements designate routes and capacity and enable governments to assign routes to carriers, normally their own national carriers.

Although all bilaterals within the EU were annulled with the advent of the single market, each state still claims the authority to negotiate bilateral agreements with 'third countries' (such as the US). Such agreements are exclusive in nature and normally contain a nationality clause under which, say, Belgium could withdraw traffic rights from a Canadian airline under the Belgian bilateral with Canada if it was not satisfied that Canadian citizens had 'substantial ownership and effective control' of the airline.²⁰

While EU airlines are 'Community carriers' within the single market, their aircraft still require national registration, and for purposes of operating outside of Europe, airlines must still meet the requirements of nationality specified in their bilaterals. Indeed, the definition of a 'Community carrier' is itself exclusive in character, requiring that at least 50% of an airline be

²⁰ On the issue of airline nationality, see Gertler (1982-3, 1994), and Staniland (1998).

controlled by EU nationals to qualify for traffic rights within the single market.

The survival of the Chicago system explains why Member States still want to ensure that 'substantial ownership and effective control' of their airlines are in the hands of their own nationals. Much of the revenue of major EU airlines is generated on intercontinental routes and historically state-owned 'flag carriers' have been able to derive rents from the duopolies they shared on specific routes with the flag carriers of other bilateral signatories.

Privatization, while offering opportunities to national airlines, also contains a danger. As state-owned airlines, they met, by definition, the test of national ownership. But privatization creates the possibility of investment, even amounting to "substantial ownership and effective control," by non-nationals. Other parties to bilaterals might then invoke the nationality clauses in their agreements to deny traffic rights.

The European Commission regards bilaterals containing exclusive nationality clauses as incompatible with the single market. But, because of their stakes in routes beyond Europe, Member States have taken steps to monitor and limit foreign ownership of shares in national airlines operating on such routes. Paradoxically, airline managers, while eager for access to capital markets abroad, also want to stop purchase of shares by foreign nationals if it puts their airlines at risk of 'denationalization.'²¹ One form of denationalization thus creates vulnerability to another.

Current proposals for privatization deal with this problem in two ways. One way - adopted by France, Belgium and others - involves the state keeping at least 50% of the shares of a national airline. Belgium thus allowed Swissair to buy 49.5% of Sabena, but not 50.5%. Swiss purchase of the latter percentage would have ended Sabena's claim to be a Belgian airline and its claim on any rights negotiated by Belgium.²²

The second way is for a state to give up its majority holding and either retain a 'golden share' or (particularly if it is divesting completely) to create legal mechanisms that prevent non-nationals from acquiring a proportion of shares in national airlines that will imperil their nationality status. Germany, for example, recently enacted legislation coinciding with the full privatization of Lufthansa that enables German airlines to monitor the nationality of shareholders and to block further purchase of shares by non-Germans if the total of foreign-held stock is approaching 50%. Indeed, the law enables an airline to require the resale of foreign-owned stock.

²¹ Portuguese critics of privatization use the term, *desportugalizar* (deportugalize), to express the fear that it will lead to foreign control of important businesses (Corkill, 1994, p.222).

²² In this context, the reported (but apparently abortive) Spanish proposal to sell a majority of Iberia's shares to BA and AA is puzzling, since if implemented it would have endangered Iberia's bilateral rights and might also have endangered its status as a 'Community carrier,' depending on what proportion of its stock was owned by BA and other EU nationals.

EU airlines flying outside Europe thus find themselves in an anomalous situation. They have to operate under two regulatory regimes: one requires them to have a clear and exclusive national status, the other denies or discourages the attribution of rights on grounds of nationality. This situation has almost certainly created corresponding legal anomalies, notably in apparently restricting the rights of EU citizens and airlines to invest in airlines in other Member States, regardless of EU law concerning (for example) the right of establishment.

Yet, anomalous as this situation is, it does present a barrier to the concentration of the airline industry seen by Wright and others as a likely consequence of privatization. European governments and airlines, even after privatization, can prevent takeovers by other EU airlines in order to protect external traffic rights. Indeed, the very existence of the bilaterals should discourage any airline from even trying to take over another with long-distance routes, since a victory would be Pyrrhic.

Returning to the original question, we may conclude that:

- (1) privatization matters, but the purposes for which it matters (and the motives inspiring it) may conflict with each other;
- (2) governments' interest in privatization has little to do with its impact on the industry or with the values of the single market;
- (3) whether privatization encourages competition depends on how it is implemented and on whether a regulatory regime exists that can prevent a public monopoly becoming a private monopoly. The competitive environment, not ownership *per se*, determines whether privatization is likely to lead to greater competition or not;
- (4) privatization is a necessary condition for involvement of EU carriers in international alliances and a necessary but insufficient condition for a concentration of the EU airline industry;
- (5) it is insufficient because the Chicago regime requires preservation of a nationality status that seems at odds with EU law but does obstruct any EU airline trying to take over another with significant intercontinental traffic. And the latter category contains all the airlines subject to privatization, and all major national airlines in the EU - except Luxair.

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J.P.

Airfreight Demand: Responding to New Developments in Logistics

Paper by

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at the

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1 INTRODUCTION

This paper considers developments which are occurring in international logistics and the appropriate response of the air freight sector. Logistics is the term used to describe the systematic management of freight (and, increasingly, passenger) movements in such a way that disfunctionality along product value chains is reduced or eliminated. Disfunctionality is manifest by high inventory levels (in the case of passenger transport, waiting times), notably at break points in the value chain such as intermodal transfer nodes or the interfaces between manufacturing activity and transport.

It is noted that all activities in the product chain, whether manufacturing or transport, must add value. In the traditional perspective of business processes [Figure 1], each stage of the value-adding sequence was seen as an independent economic activity. Exchanges of materials and goods between stages of production occurred in an open market. Efficiency optimisation was fragmented, since it was constrained within the boundaries of the independent firms. Scale was a key competitive variable, and 'horizontal' integration a favoured path towards it. The value-adding chain involved multiple inventories, with stock used to cushion against the uncertainties of action of other participants in the chain. Transport was a passive agent in the production process, and pursued its own internal objectives which were usually those of cost minimisation on the assumption that was what the user wanted.

The contemporary perspective is a contrasting one [Figure 2]: it is of the process of production as an integrated chain of value-adding activity extending 'vertically', from the basic extraction and processing of raw materials to the final distribution and sale of products at retail outlets (Hines, 1993). Firms along the chain act as partners, with information flowing freely between them to reduce uncertainty and the need for buffering between the production stages. Operations along the chain, including transport, are tightly controlled, co-ordinated, and synchronised. Value chains stretch around the globe, with multinational corporations placing the various manufacturing elements in locations providing the greatest competitive advantage and the logistics sector providing the necessary connections (Kasarda and Rondinelli, 1998). The tightness of the connection of many airfreight operators into the value chains of MNC producers is demonstrated by the rapid changes in air cargo traffic volume and composition in Asia during the 1997/98 financial crisis in that region (Nelms, 1998).

Figure 1: The traditional perspective of business: fragmented value adding chain

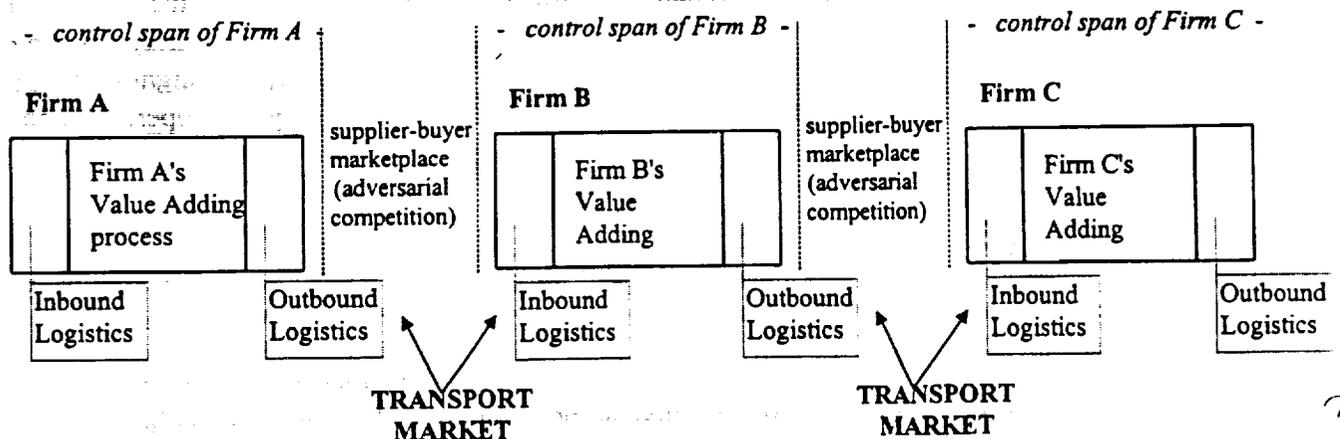
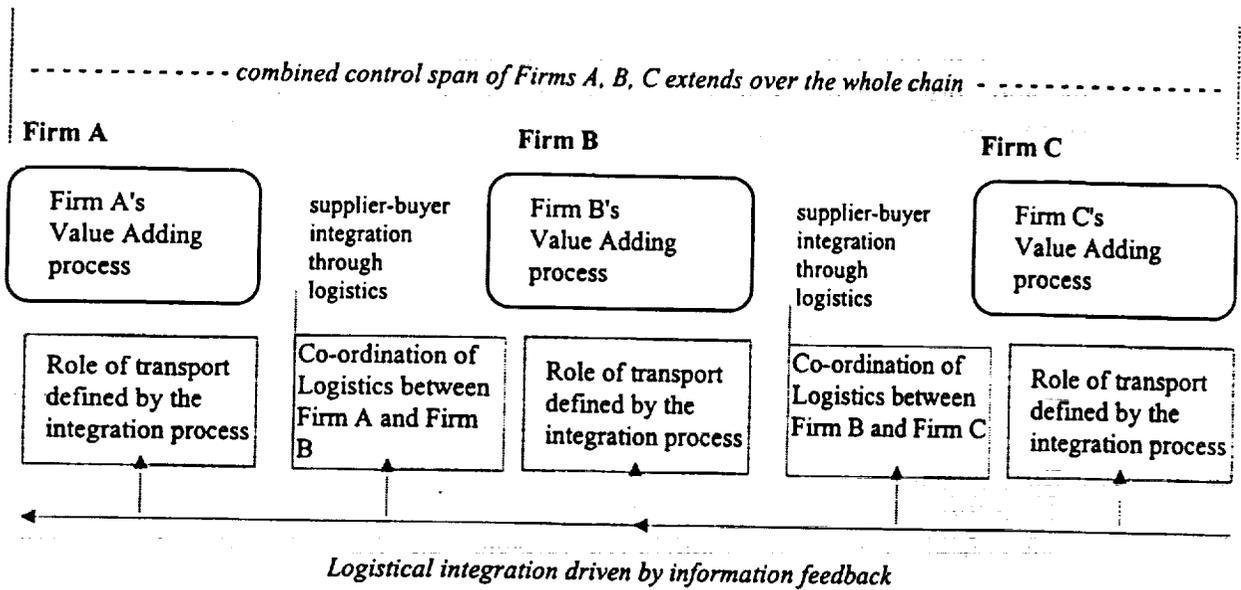


Figure 2: Contemporary perspective of business: vertically integrated value adding chain



Traditionally, inventory was used to buffer against incompatibilities of adjacent links in supply chains and against operational uncertainties. Now, due to the many advances in information-communications technology (ICT), it has become feasible for information to substitute for inventory. Since information is becoming increasingly cheap and inventory increasingly costly, the trend towards this substitution seems likely to continue. Electronic Data Interchange (EDI) is permitting inventory/information trade-off to be optimised along the entire value chain. The advent of expert systems and artificial intelligence suggests that logistical optimisation will become increasingly sophisticated and wider in scope.

Much has been written about the impact of transport on society, longitudinally over time and latitudinally between regions. Historically, there has been a close relationship between advances in communications and economic progress, in some cases involving leaps in knowledge such as when it was discovered the world is round, or when aviation became a mainstream mode of transport.

Modern society relies heavily on the availability of sophisticated levels of physical mobility. Where transport supply is inadequate for the amount and pattern of demand, adjustments must be made. When infrastructure is fixed, as it is in the short term, the emphasis of adjustment falls on the demand side. Thus, the air commuter may have to depart early to allow for expected ATC delays; the holiday maker may sleep overnight at an airport to meet the requirements of cheap packages; the air freight company may operate through the night and weekend to avoid peak-time congestion in complexing activity; the manufacturer may use inventory to protect production against fluctuations in the supply chain caused by uncertainties; and, at the end of the chain, the consumer may make do with frozen or tinned food at the supermarket or more generally bear inventory costs to guarantee product availability.

There is a limit to the acceptability of short term market compromise possibilities. People attach a value to time wasted at ports or airports; the commercial market has a

resistance to excessive inventory costs; there are environmental objections to transport vehicles working at night and weekends. The longer term option is to expand transport supply and capacity.

Traditionally policy makers have tended to follow a cycle of: *infrastructure supply - transport service supply - traffic growth - traffic congestion - demand adjustment - infrastructure supply*. In recent years doubts have arisen regarding the ability of this loop to operate quickly enough and indeed about the long term sustainability of this cyclical approach (ECMT, 1993). There are increasing concerns about whether infrastructure indefinitely can meet the ever-growing demand for mobility (OECD, 1993), whether the environment can absorb projected vehicular resource usage and emissions (CEC, 1992), and various other aspects of transport growth (CEC, 1996). While much attention has been paid to land transport, and the dichotomous problems of road and rail transport, increasingly there are problems of congestion at airports and in air traffic control.

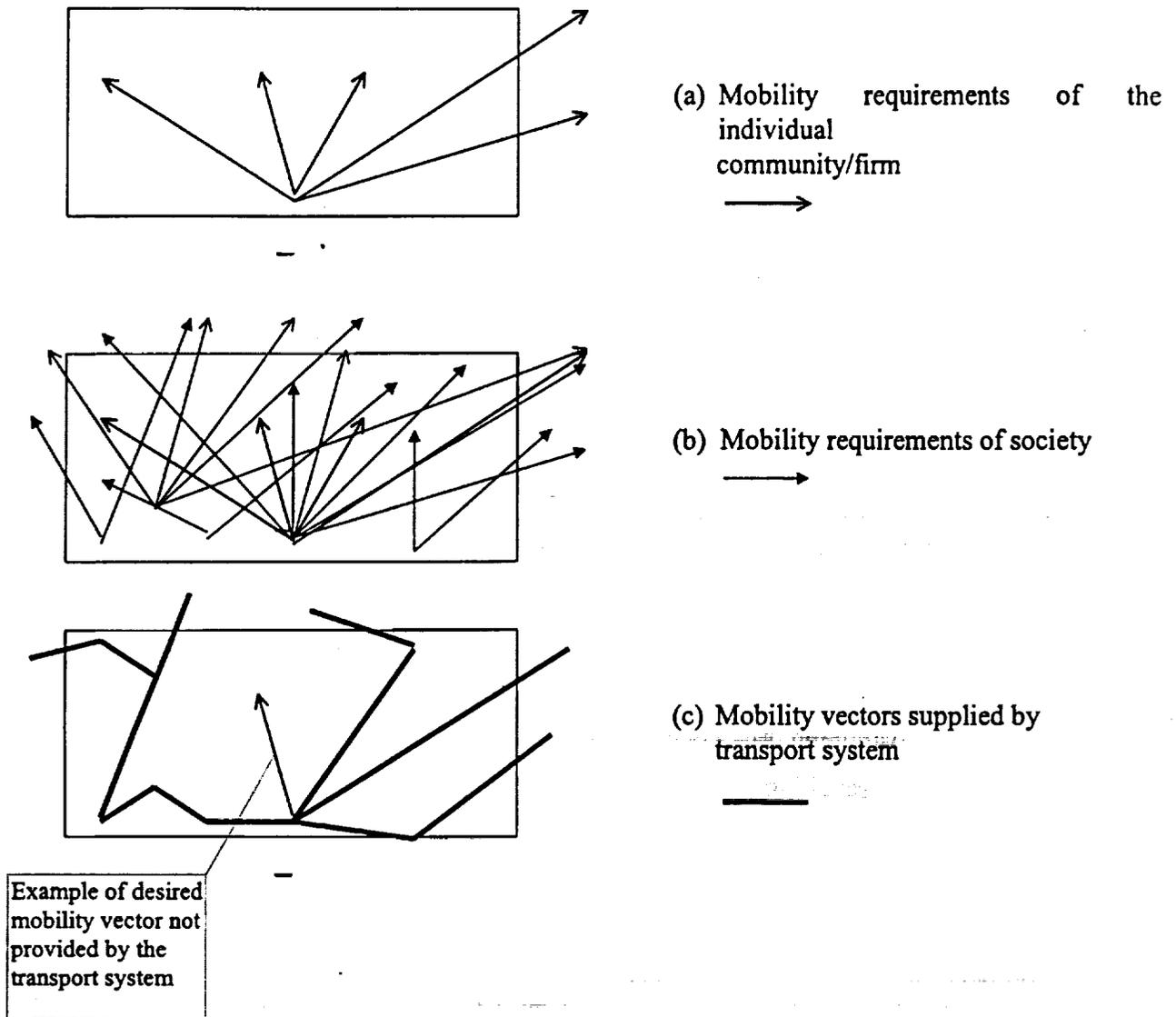
To the extent constraints in transport infrastructure supply act as a brake, demand must be accommodated on existing networks through increased levels of operational inefficiency (OECD, 1994). In principle the user may cope with network congestion by:

- (a) absorbing delays on the routes chosen (i.e. accepting longer transit times)
- (b) re-routing to less busy or more expensive routes (i.e. accepting higher costs)
- (c) changing destinations (i.e. substituting inferior destination activity)
- (d) postponing travel to off-peak times (i.e. increasing waiting/inventory times)
- (e) not travelling at all.

The inability of the transport system to provide the vectors of mobility required by the user forces the acceptance by the user of alternative vectors of mobility [Figure 3]. Ideally this involves an allocation or rationing process which achieves the appropriate re-distributions in an equitable manner. While it may be acceptable from the viewpoint of congestion control that the marginal user who finds the compromise vector unacceptable may opt to postpone or abandon the plan to travel, from the societal point of view this represents a failure, and an overall loss against the goal of providing each community with its entitlement of physical mobility. The magnitude of the loss depends on how the user subjectively values the inconvenience of delays, re-routings or suppressed travel. At the macro level and from a longer term perspective it is interesting to reflect, as the transport policy maker must, on the level of transport infrastructure provision which would be necessary to ensure every community and industry regularly received its desired envelope of mobility vectors. It could be that the ideal transport system should provide services which are continuous, costless and available in all directions with no adverse impact on the environment.

Clearly the ideal does not exist. In practice transport infrastructure tends to be provided where it is most likely to give the greatest number of users the greatest level of satisfaction, and each community or industry adjusts its required mobility vectors a little, in timing, cost or direction. Ultimately this may lead to re-location decisions or to variations in the pace of development of communities. It may influence the overall configuration of industry in a region. It may influence the degree of 'vertical integration' achievable between units of production in different regions. It may influence the strength of inter-regional 'cohesion' (Cecchini, 1988).

Figure 3: Vectors of Mobility



2 VIRTUAL MOBILITY

Given that transport has difficulties in responding to society's seemingly insatiable needs for mobility, it may be fortunate that today's citizen and firm has possibilities for the substitution of physical mobility, using various forms of electronic mobility. While transport seems to be increasingly constrained in its mission to supply services which are continuous, costless and available in all directions, the telecommunications system seems to have no such constraints and indeed seems to be developing ever more rapidly in terms of interconnectivity, falling costs and multi-directionality (Mansell, 1993; Giannopoulos and Gillespie, 1993).

The traditional definitions of mobility have tended to focus on specific categories of human interaction involving physical movement for a definite purpose. However most citizens now accept the substitution of virtual mobility for physical mobility in the case of at least some

forms of human interaction, most notably conversations made by telephone. Additionally, the range of substitutions which have broad acceptance is growing. There is the fax, which is substituting for printed paper mobility. There is e.mail, which is substituting for telephone conversations, printed paper mobility and some types of meeting. There is the INTERNET, which is substituting for some traditional forms of marketing and service-product distribution and creating a new world of *electronic commerce*. Theatre tickets, holidays, conferences can be booked using the combination of telephone, INTERNET and the credit card system. Instead of going to the cinema we watch movies on videotape. Live sports events can be watched through television at home or on large screens in remote stadia.

Table 1 lists some basic trip purposes, the traditional transport modes associated with them and some new modal possibilities. In each case one can reflect on (a) the characteristics of the interaction which influence the feasibility of substitution for the traditional transport modes and (b) the potential market extent of the substitution, in terms of those market segments which initially are most amenable to the substitution and the degree of substitution which is likely to take place in the longer term.

Table 1: Trip purposes, traditional transport modes and new modal possibilities

Trip purpose	Traditional modes	New modal possibilities
Visit a friend	Walk/bicycle/car	Telephone/videophone
Commute to work	Car/public transport	Telecommute
Long distance meetings	Air/rail	Videoconference
Supermarket shopping	Car	Teleshop, van deliveries
Dine at a restaurant	Car	Home deliveries
Rural schools	Car/bus	Satellite broadcasts
Go to the cinema	Car/bus/walk	Hire a video
Attend a sports event	Car/bus/train/air	Watch on television
Post a letter	Rail/ship/air/road	Fax or e.mail
Deliver a typed report	Car/van/air/sea	Send via modem
Distribute newspapers	Road/rail	Display on WWW homepage
Distribute software	Road/rail/ship	Auto-install via INTERNET
Go to a concert	Car/public transport	Listen to quadraphonic CD

It would be useful to have a new typology of trip/interaction purposes, which would permit a categorisation of the service at the core of each interaction purpose, and a reconceptualisation of purpose on the basis of its information-transfer content and the significance of physical proximity to the effectiveness of the transaction. Many hospital operations are now carried out by 'keyhole surgery', with the surgeon using robot-type equipment. Will the location of the surgeon at the location of the patient always be a necessity?

For the purposes of this paper the most relevant observation may be that the list in Table 1 is far from complete — because mankind's substitution possibilities seem to be growing all the time as information technology develops and as the level of 'intelligence' in information systems increases.

Even though the concept of 'virtual mobility' is still in its infancy we can state some basic 'hypotheses':

- ▽ there seems to be a 'life-cycle' in the pattern of acceptance of new possibilities for substitution, involving innovation, experimentation and a gradual spreading of the application as experience grows and improvements are made
- ▽ there are some forms of virtual mobility which now have widespread acceptance as a substitute for physical movement (e.g. the telephone, the fax), and others which are well on their way to widespread acceptance (e.g. Internet applications)
- ▽ behavioural patterns to date suggest that while few people or firms may, in the case of any given application, opt for 100% substitution of virtual for physical mobility, many will accept partial substitution
- ▽ for freight transport, the potential for substitution depends on the information content of the goods, especially in the context of the trend towards the 'de-materialisation' of products and the ability of the material content and information content to travel separately
- ▽ as the traditional transport options are subject to increasing delays, costs or restrictions, the relative attractiveness of options for virtual rather than physical mobility will increase
- ▽ the propensity to substitute will differ by transport mode, given the known links between trip purpose, origin-destination distance and mode choice
- ▽ the reaction to substitution possibilities seems to be generational, i.e. young people appear to be generally more accepting of electronic media than older people and become proficient more easily; over time, therefore, the population as a whole should be expected to become more accepting of virtual mobility
- ▽ in the evolution of new equilibria between physical and virtual mobility, elements of the new information technologies may contribute to the enhancement of the traditional transport options (e.g. telematics for better control, routing, scheduling; onboard telephone/fax facilities to enhance passenger services, etc.)

3 TWO KEY ISSUES

There can be little room for argument about the 'explosion' of innovations and advances in the field of information technology, and about the spatial impact which the various innovations are having — even though in most cases they are early in their life cycles and often may be less than user friendly in the early stages. To quote TIME magazine: "It took humanity more than 2 million years to invent wheels but only about 5,000 years more to drive those wheels with a steam engine. The first computers filled entire rooms, and it took 35 years to make the machines fit a desk — but the leap from desktop to laptop took less than a decade"

(Lemonick, 1995). Today, the marginal cost of a telephone call has become so insignificant that distance is no longer a determinant of telecommunications cost; there are views that this development will be the single most important economic force shaping society in the first half of the next century (Cairncross, 1995).

One key issue for transport policy makers, however, is whether virtual mobility actually substitutes for physical mobility or whether both are potentially part of the same 'explosion' of mobility, ultimately synergising, leading to overall growth in both fields, and adding to rather than taking ameliorating transport demand.

In air transport, there is debate about whether teleconferencing technology will reduce or increase business travel: here, it could be that while physical mobility (air travel) ultimately may cater for a reduced market share of the total conference market, the total market will be greatly increased by the stimulation provided by teleconferencing. Similar considerations apply to the relationship between television and leisure travel: for example, while the market share of those watching events from home has increased, television has helped stimulate the overall market so that there are increased attendances at many major events. There have been numerous analyses of actual and potential interactions between telecommunications advances and travel demand (e.g. Salomon, 1986; Banister et al, 1995). Button (1995) examines the question of whether telecommunications acts as a substitute or complement to transport and the difficulty in predicting the overall effect.

The co-evolution of communication and transport has been observed in history. Alt et al (1996) recall that for the vast majority of human history, communications beyond the carrying power of the human voice were subordinate to the transport infrastructure of the time. Written correspondence or other physical tokens had to be carried physically until the advent of the telegraph in the mid 19th century. The subsequent co-development of the railroad and the telegraph in the USA provides an early example of communication/transport growth synergy.

A second key issue is whether the advent of virtual mobility offers real possibilities for pro-active responses by the transport sector, and new opportunities to address endemic problems. In principle, the availability of acceptable substitutes for physical mobility should lessen the impact on society of 'failures' of transport supply. Assuming one can identify those trip purposes for which there are good substitutes for physical mobility, and those segments of the transport market that may be diverted to the substitutes without an unacceptable level of hardship, the supplier of transport infrastructure may find there is more room to manoeuvre than would otherwise have been the case. This is especially relevant where there are severe constraints on the expansion of transport supply, e.g. for financial or environmental reasons.

Any spatial or social impacts of virtual mobility to date have, however, been the outcome of a predominately passive, rather than pro-active, disposition of policy makers with regard to the substitution of virtual for physical mobility — i.e. the take-up has been largely market-driven or laissez faire and the question of 'optimisation' of the virtual/physical balance has been more or less unaddressed in transport policy making.

There are reasons for this: in most countries transport and telecommunications are regarded as separate sectors, and transport firms have tended to define their interests and competencies in terms of physical movement. There are various work-practice constraints and traditions which make it difficult to redefine the role of transport as one of *mobility provision through either physical or virtual means*. Additionally, it must be recognised that the

developments in telecommunications have occurred very quickly and were neither planned for nor foreseen.

One way or the other, it is interesting to consider in more detail the possible benefits which the transport sector might accrue through a more pro-active approach to demand management and substitution using the opportunities presented by the various new modes of telecommunications. The indications are that the demand for mobility in total, i.e. whether physical or virtual, is increasing at unprecedented rates. In developed countries, there are signs that transport growth is plateauing, while electronic communications are growing at exponential rates. In developing countries, there is a more even balance between the growth of transport and telecommunications, given that both are growing from a low base. In some countries which are facing abnormal economic adjustment, such as those in Eastern Europe, there are indications that telecommunications investment may be used to redress inadequacies in existing transport infrastructure.

It would seem to be impossible to contemplate the future demand for transport in isolation from the future demand for telecommunications and the question of the optimal interaction between the two mobility modes.

4 IMPLICATIONS FOR FREIGHT TRANSPORT

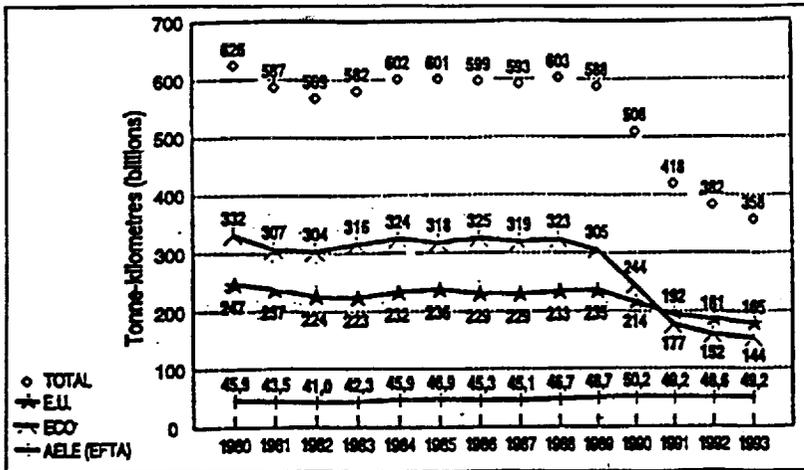
Developments in information technology have impacted on freight transport in at least three different ways: (a) the increased information content of many products, coupled with a general trend towards de-materialisation, has changed the character of products being transported and in some cases has created new distribution options; (b) the use of information technology to 'integrate' product supply chains, with a strong emphasis on inventory reduction, has redefined the role of freight transport; and (c) information technology has provided new management and control possibilities for the freight transport function itself.

4.1 Value chain developments

New organisational formats have emerged — ranging from centralised ownership along entire and often international processing chains, to complex contractual arrangements between firms which internalise risk sharing and enshrine co-operation, to the elaborate inter-organisational dependencies common in Japanese industry and for which the integration of production is strongly cultural (Milés and Snow, 1986).

Within the various frameworks, product quality and delivery reliability have become central to competitiveness, and the concept of product is defined not merely by the nature of goods sold but by a combination of the goods and the quality of the service with which they are delivered to the end customer. In this business environment, the traditional boundaries between manufactured produce and services have become blurred, and many hybrid products (well known examples include computer software, instantly developing photographic film, fast food outlets, auto-diagnosis health devices) have emerged.

Figure 4: Recent rail freight traffic trends in Europe



Source: Activities Report 1993-1994, Union Internationale des Chemins de Fer (UIC), Paris

Figure 5: 'J4U' Distribution

Few origins

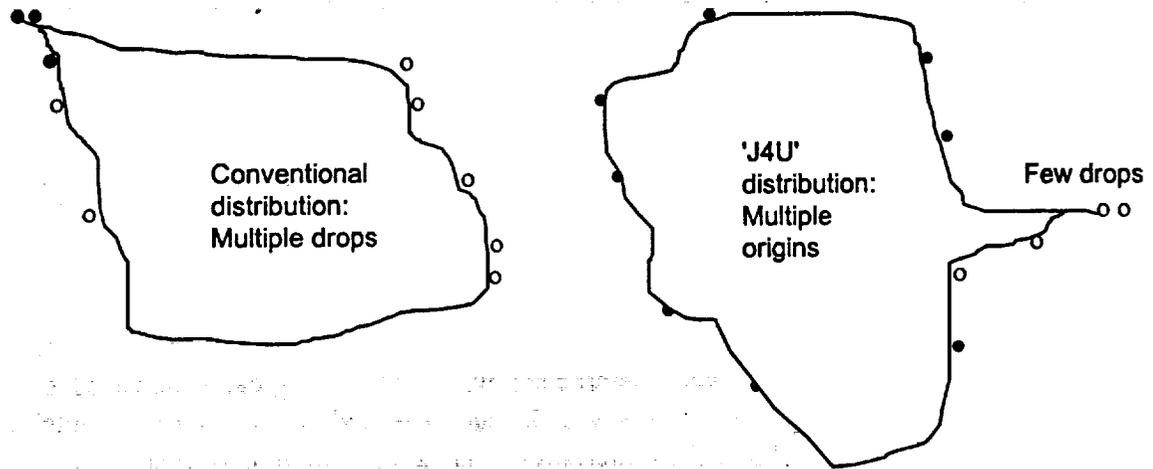
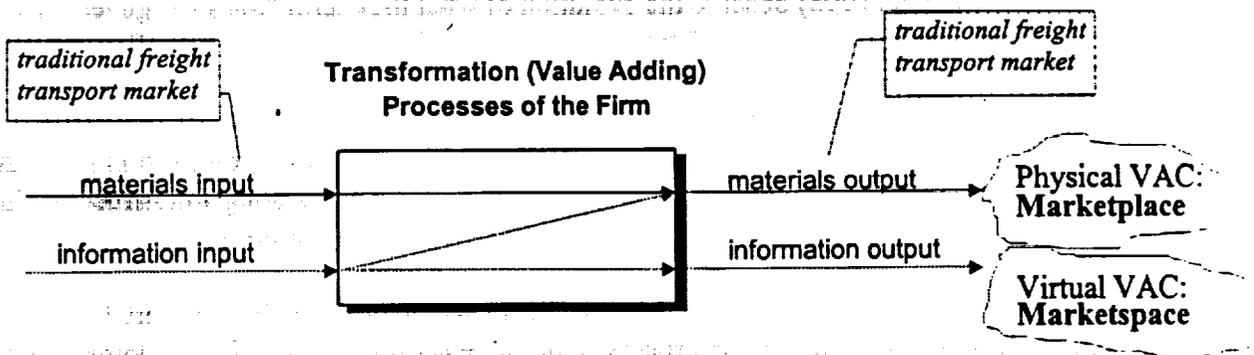


Figure 6: Marketplace and marketplace



As products become lighter in terms of their material content (through the use of plastic materials and better design concepts) and more information rich (through the use of microchips), trends towards the 'de-materialisation' of products have been observed. Figure 4 shows the trend in rail freight traffic in Europe for the period 1980-1993. Chatelus et al (1995) provide an interesting analysis of freight traffic versus GDP in Central European countries as they transform from planned economy to market economy status.

4.2 Possibilities for innovation

The thrust of technology and of product innovation is towards the 'tailoring' of individual product designs for each consumer; a growing task for the logistics function is to find ever more innovative ways of allowing the marketplace the level of choice it demands while maintaining distribution cost and efficiency at affordable levels (Fuller et al, 1993). Some forecasters envisage that, in those retailing sectors which currently favour the large-store format, traditional retailing involving the movement by car of the customer to a retail premises may be replaced by a channel structure in which manufacturers interact with consumers directly through telecommunications, and use home delivery services to bypass conventional retail outlets (Business Week, 1993b). Ultimately shops may become less central in commerce, as direct distribution from electronically-triggered warehouses grows.

Entrepreneurial logisticians may begin to organise new types of distribution service focused not as traditionally on the producer as origin, with multi-drop destinations, but on the consumer as destination, with multi-pickup origins ('Just for You', or 'J4U', distribution, as shown in Figure 5). Late changes in orders or in destinations will be accommodated via a telecommunications link with the delivery van, freight train or aircraft, and by the use of product finishing facilities which will be not at the factory but on board the vehicle (e.g. final assembly, sorting, printing, labelling, packaging). Principles of value-adding distribution have always been applied within the transport sector (e.g. the traditional sorting of mail on trains), but the full potential of the delivery vehicle given the capability of onboard computers and of miniaturised manufacturing equipment has yet to be realised.

The more accurate knowledge of customer requirements coupled with the technological ability to fine-tune delivery parameters will lead to a greatly enhanced customer service capability. Helping this process will be an increased use of "artificial intelligence" in the logistics function. Apart from measures to enhance vehicle performance and co-ordination in the form of "intelligent" vehicles and road infrastructure, there will be "onboard intelligence" in freight consignments, in the form of embedded information and scannable codes.

Alt et al (1996) observe the evolution of what they term "transport governance systems" aimed at driving costs out of transport value chains and enhancing efficiency levels with greatly reduced labour inputs and faster speeds. They see the future of both passenger and freight transport as fundamentally dependent on information infrastructure, ironically just as communication was once dependent on transport. They see the great payoffs in transport over the next two decades as coming from the leveraging of existing infrastructure through an interlinking of future transport and telecommunications development.

The future scenario therefore is one in which the freight transport firm will play an integral role in the production processes, or value adding chains, of its customers. Its task will be to provide the links between suppliers and manufacturers at the various stages in the chain,

with materials and goods flowing under careful control to minimise inventory levels and respond accurately to consumer trends (OECD, 1992). The freight firm will play an increased role in the final stages of production, helping to provide flexibility of destination choice, delivery timings and product presentation (i.e. value adding distribution). All this will be possible only through a heavy linkage with information technology.

4.3 The virtual value chain: marketplace and marketpace

There is a need for a new typology of freight traffic categories, involving a re-conceptualisation of the concept of goods movement. Rather than focusing merely on weight or distance as hitherto, it would be useful to identify the core purpose and characteristics of the goods as seen by the consumer, their required delivery characteristics, and their embedded information content including accompanying services (which could have passenger transport implications).

It is said that today every business competes in two markets: the *marketplace*, in which resources and products exist physically and require traditional freight transport services and the *marketpace*, which is a virtual world of electronic commerce in which the main object of transaction is information [Figure 6]. Managing two interacting value-adding processes, in the two mutually dependent realms, is seen as posing new conceptual and tactical challenges for every firm (Rayport and Sviokla, 1995).

Some firms may choose to operate wholly or heavily in the virtual world, in which case their output may be mainly information. In the case of some products, for example computer software, the ratio of physical to electronic transport may change over time to the point that the entire product travels electronically. Where firms operate predominantly in the virtual world, the challenge of catering for their physical freight flows may be less that of ensuring the required origin-destination speed as that of coping with rapidly-varying origins and destinations (Business Week, 1993a).

In responding to these developments the transport firm is faced with a choice of (a) continuing to play the traditional role of carrying physical freight or (b) redefining its role to include the conducting of information flows.

(a) Traditional Role: Catering for the traditional transport marketplace will have the advantage of corresponding to the expertise and traditional scope and of the transport profession. However, in many sectors, physical goods are likely to be a decreasing portion of the modern firm's total output and a progressively weaker predictor of its mobility requirements.

(b) Redefined Role: Catering for the customer's marketpace requirements (information conducting), in addition to those of its marketplace (physical freight) will have the advantage of permitting the full picture of the firm's mobility requirements to be addressed. However, it could be argued, this role may be beyond the scope and competence of the conventional transport firm.

Apart from the question of defining its main market, the freight transport firm should also consider its involvement in ancillary markets appropriate to the era of electronic commerce. Most transport firms generate and use information as a byproduct of their main

activity. This information and the systems which handle it may themselves have commercial value and permit the offering of products in the marketplace.

For instance the Computerised Reservation Systems (CRS) which have been developed and used by the larger airlines to co-ordinate bookings and assist yield management have value to smaller airlines and travel agents. Latterly, they have become available to prospective customers via INTERNET. Airlines may earn substantial revenues from their hosting of CRS services, in addition to their mainstream aviation activities. Similarly, express freight firms can earn additional revenue through the provision of public access to their package-tracking services in addition to their mainstream freight carrying activities.

5 LOOKING TO THE FUTURE

5.1 Transport infrastructure

In the light of the many developments foreseeable in the evolution of and demand for mobility, it is relevant to consider the appropriate response of the supply side of the transport industry. In the first place there is the question of transport infrastructure. In Europe, considerable analysis has already been conducted into the appropriate Trans-European Networks for the next century, taking account of the continent's mobility requirements in the light of its political goals for regional integration, cohesion and economic development.

The most basic question is that of the appropriate geographical configuration of transport infrastructure, in terms of the routes, nodes and traffic capacity to be provided for each of the transport modes. Some important 'missing links' have been or will be filled in — such as the Britain-France Tunnel and the Scanlink connection between Denmark and Sweden. There also has been an identification of the busiest ports and airports and the priorities for expansion taking a systemic view. There is the never-ending question of which of the congested links to expand, always mindful of the environmental balance sheet. There is a concern that future transport should be 'sustainable', and also that it be economic and competitive.

To minimise unnecessary duplication between transport modes, and to promote inter-modal synergy, there is widespread interest in the promotion of *Combined Transport* and transport intermodality generally (CEC, 1997). This is partly a matter of infrastructure development and partly a matter of transport service co-ordination.

The concept of *Logistics Platforms* is especially relevant in this context. These are nodes which provide 'hub and spoke' type route connections and vehicle load transfer facilities, and as such provide the essential interface between transport infrastructure and transport services. Increasingly there will be the capability of bringing enormous amount of computing power and intelligence to bear on routing and vehicle loading decisions, with the additional advantage of allowing these decisions to be made on a whole-network basis (Smith, 1994).

5.2 Robust infrastructural needs versus flexible service needs

In principle delays caused by schedule clashes or late traffic changes can be foreseen and eliminated through a widening of the appraisal scenario in both time and space. In principle, the computer can pre-store arrays of contingencies for myriads of possible events, and instantly provide the most appropriate system response to every operational problem. Not only has ICT the capability of overcoming the various management and combinatorial complexities that are endemic in transport systems, but it also can help the transport system to harmonise with the new transport requirements of the virtual world.

In freight transport, for instance, the shipper may require real-time space booking facilities, automatic monitoring of consignment status, and automatic delivery confirmations. The merging of physical product components with virtual product components may be part of the distribution task: for example, the programming of computing devices at their final destinations, the printing of newspapers at their delivery points, or the cooking of hot meals for home delivery.

In the context of the *'Information Society'*, the transport planner must consider carefully the dual requirement for a robust long term perspective of infrastructural needs and a highly flexible short term perspective of service needs. Some elements of transport have been and will remain patently inflexible — fixed rail infrastructure, airport runways, canals, harbour berths, for example. The construction of these elements in the wrong shape, at the wrong location or at the wrong time has always been associated with problems of early obsolescence and financial loss. While the transport system may have rallied round such mistakes in the past and adjusted or compromised traffic patterns to ameliorate the negative consequences of imperfect planning, this tactic may not be as easily engaged in a fast-changing demand-driven market environment.

Some long-lived fixed investments such as airports and undersea tunnels may be less vulnerable than others where they provide central or pivotal elements of the network and are robust against changes in traffic composition. Part of the planning task will be to identify such 'core' elements of the transport network. For these elements it is possible that state-of-the-art 'conventional' technology will suffice, and that obsolescence will not prove to be a major concern. For the non-core network elements, however, the task will be to plan for usage flexibility, in both traffic operations and market composition, and to ensure that fixed investments are robust against a variety of contingencies. Elements of the new 'paradigm' should embrace the following:

- ▽ multi-purpose vehicles, providing rapid interchangeability between passenger and freight configurations, have the advantage of reducing scheduling constraints and assisting the rapid market responsiveness required by both markets
- ▽ high-speed transport tends to generate higher service frequencies and shorter average waiting/ inventory times at transfer nodes
- ▽ several small airports catering for STOL aircraft might, in the context of the requirements of the vertically integrated value adding chains prevalent in modern industry, serve a region better than one large airport
- ▽ the provision of onboard value-adding facilities (such as information processing support and product processing/finishing facilities for freight) is likely to enhance the flexibility of every transport mode

- ▽ all transport modes must plan for extensive use of ICT (telematics) both to enhance modal efficiency and to provide the necessary integration between marketplace and marketspace
- ▽ the nodal positioning of logistics platforms should be kept as flexible as possible (i.e. they should match the 'footlooseness' of industry), by minimising fixed installations and storage infrastructure, and maximising redeployability
- ▽ where the information content of a product is transmitted electronically and the material content is transported in parallel, the value of 'material only' may be low enough to permit moderate increases in inventory levels in the transport system and corresponding increases in operational flexibility
- ▽ technologies for unit costing of transport are likely to improve enormously, for both internal resource usage and externalities; revenue collection will be by smartcard and highly transparent; all support activities of transport firms (customer information, timetable changes, tracking systems, etc) will be conducted in the marketspace
- ▽ in freight distribution, the emphasis will swing from single-origin-multidrop towards multiorigin-single-drop as electronic shopping from retail warehouses becomes prevalent; distribution vehicles will be 'intelligent' i.e. provide for controlled refrigeration of perishable goods, controlled heating of pre-cooked meals, onboard printing of labels, etc.
- ▽ as concern for the conservation of natural resources continues, industry will increasingly emphasise the re-use/re-cycling of materials in product and logistical design; the provision of economical reverse logistics channels will be a major new transport pre-occupation

In the light of these, and many other similar observations which could be made, it may be argued that the task of the (regional) transport planner will in future revolve around:

- ⇒ the identification of the elements of the core transport network, in the context of forecast population and industrial trends together with anticipated regional and political priorities
- ⇒ the specification of non-core network elements, recognising that nodes (platforms) may require to be adjustable in capacity (scaleable) and location (footloose) and that traffic will be interchangeable between physical (marketplace) and virtual (marketspace) modalities
- ⇒ more creativity than hitherto at the level of transport operations, on the basis there will be an increasing level of technological capability and an ever-expanding computational capability, so that traditional operational constraints will be decreasingly important.

5.3 The need for a pro-active strategic response

There have been step changes in transport technology in the past which have had severe effects on the industry. When aeroplanes replaced passenger ships in ocean transport, there was a sudden and devastating decline in demand for ocean liners. When the internal combustion engine became available, road transport grew rapidly and removed a large share of what was hitherto the railways' market. notwithstanding various attempts to contain or ignore

the threat. Earlier, when the railways were built, the change in technology was quite sudden and in this case had a major impact on the demand for horse-drawn transport.

These past step changes in technology had the common feature of being on the transport supply side. They were to an extent controllable by the transport sector and they involved an extension rather than contradiction of existing paradigms about mobility and travel demand. Today, one can continue to observe the impact of changes in transport technology which have been initiated by the transport sector and do not entail paradigm shifts. For instance, due to advances in engine technology and the use of lighter materials in aircraft construction, flying ranges have been extended progressively. Some airports and routes may have grown in importance as a result, and some may have declined, but the overall effect can be explained in conventional terms.

The changes which are being produced by advances in information and communications technologies are, it is submitted, in a different category. For the first time they provide opportunities to circumvent the need for physical mobility, without the corollary of declines in economic activity and living standards.

As a *strategic threat*, they imply that if the transport sector does not satisfy the mobility needs of some or all segments of the transport market, by imposing unacceptable transit delays, re-routings or postponements, these segments may quite literally evaporate. Because the alternative forms of mobility appear to be habit-forming, market losses may not be easily reversed. Because virtual mobility is developing progressively in its sophistication, the alternative forms of mobility will appeal to a widening market segment.

As a *strategic opportunity*, the changes produced by advances in information and communications technologies provide the transport sector with the means of 're-engineering' itself to resolve endemic issues such as congestion and difficulties in management and co-ordination.

A difficulty in addressing the potential impact of telecommunications on transport is that its impact is so invisible, diffuse and difficult to quantify. Nobody will deny the impact that computerised reservation systems have had on airline market shares, or the impact which the fax has had on the transport of printed paper, yet either change is difficult to quantify. According to present indications, it is clear that the advent of e.mail will have a substantial impact on the postage sector, that INTERNET will change the role of travel agents fundamentally, and that tracking systems will have a positive impact on express freight flows. Again, however, it is difficult to quantify these effects.

It is possible that ICT will simply have a continuous 'trickle' effect on the transport sector, always diverting demand at the margin and always injecting efficiency opportunities at the core. The 'trickle' effects are what will happen if there is no intervention, if nothing is done. If, on the other hand, the transport sector chooses a pro-active response, decides to use ICT to manage and harness transport demand, to create new variants of transport services, and to find innovative solutions to endemic problems then the changes and opportunities are bound to be more fundamental.

The air freight transport sector has every opportunity to manage traffic peaks better, to deal more satisfactorily with real-time market needs through flexible routing and scheduling, and to be an integrated part of industry's value-adding chains (Wilson, 1997).

5.4 A new transport planning framework?

The traditional transport planning analytical framework has proved remarkably versatile and robust over several decades. Yet as pointed out by Bieber et al (1994), there are certain drawbacks to the use of the aggregated econometric approach in the investigation of changes in mobility, which concern a 'small scale' or micro-social domain. In an attempt to capture the more recent developments in ICT which establish it as a real satisfier of mobility need, and also the various transport-telecommunications interplays discussed in this paper, a framework such as that outlined in Figure 7 may be appropriate. Here, various geo-sociological characteristics of regions are taken as given and act as generators of profiles of 'desired interaction patterns'. These could include, for instance:

- a profile of social interactions, spatially and in time, for the average individual in each defined socio-economic grouping in each zone
- a profile of information-rich services, spatially and in time, required by the average individual in each socio-economic grouping in each zone
- a profile of material-rich services, spatially and in time, required by the average individual in each socio-economic grouping in each zone
- a breakdown of the information-processing content of the various work categories available in the zone, flagged according to their suitability for remote-based execution
- a breakdown of the information/material content of various product categories available in the zone.

Each zone would be defined by its mix of individuals and their types of household affiliation, its mix of industries and their value chain characteristics (i.e. required supplier-buyer affiliations), and its mix of work (employment) categories including product/retail categories.

As an originator of interactions, each zone would generate a set of desired social interactions, desired information-rich services, desired material-rich services, desired work opportunities for the population, product manufacturing capabilities, and desired product acquisition or retail shopping opportunities. Of particular relevance in the categorisation of individuals would be age and/or educational qualifications, as an indicator of propensity to use ICT channels, suitability of household type to home-based work (i.e. availability of space, adequate telecommunications capacity, etc), and the normal indicators of access to the various transport modes.

The decision rules of the model would focus on the fulfilment of required social interactions by either transport or telecommunications, the purchase of desired information-rich and material-rich services, the performance of work, the manufacture of the various product categories, and the acquisition of the consumer goods required by the population.

The modal split between transport and telecommunications would in the first instance be according to the current or an anticipated equilibrium between the two mobility modes, and then between the various sub-modes of each mobility mode according to the more conventional mechanisms of cost and/or transaction time. In the case of information-rich services, the split would be appropriately biased towards telecommunications and in the case of material-rich services towards transport. Work opportunities in the zone would be categorised according to the conventional descriptors and additionally according to the need to commute physically. The

marketspace proportions and value-chain requirements). Consumer goods acquisition channels would be categorised according to the existing or a desired balances between physical and electronic shopping, and between multi-drop and multi-origin distribution in effecting deliveries.

Interactions between a given {zone i} as originator and the other {zones j} as attractors would be distributed according to the available infrastructure connections and predetermined rules (e.g. always give preference to own {zone i} or to cheapest/most adjacent next best option; or, alternatively, allocate between all {zones j} according to relative costs/times/distances). As suggested by Bieber et al, the allocations could be subject to time or financial budgets, with appropriate 'second best' allocation rules once the budget thresholds are exceeded.

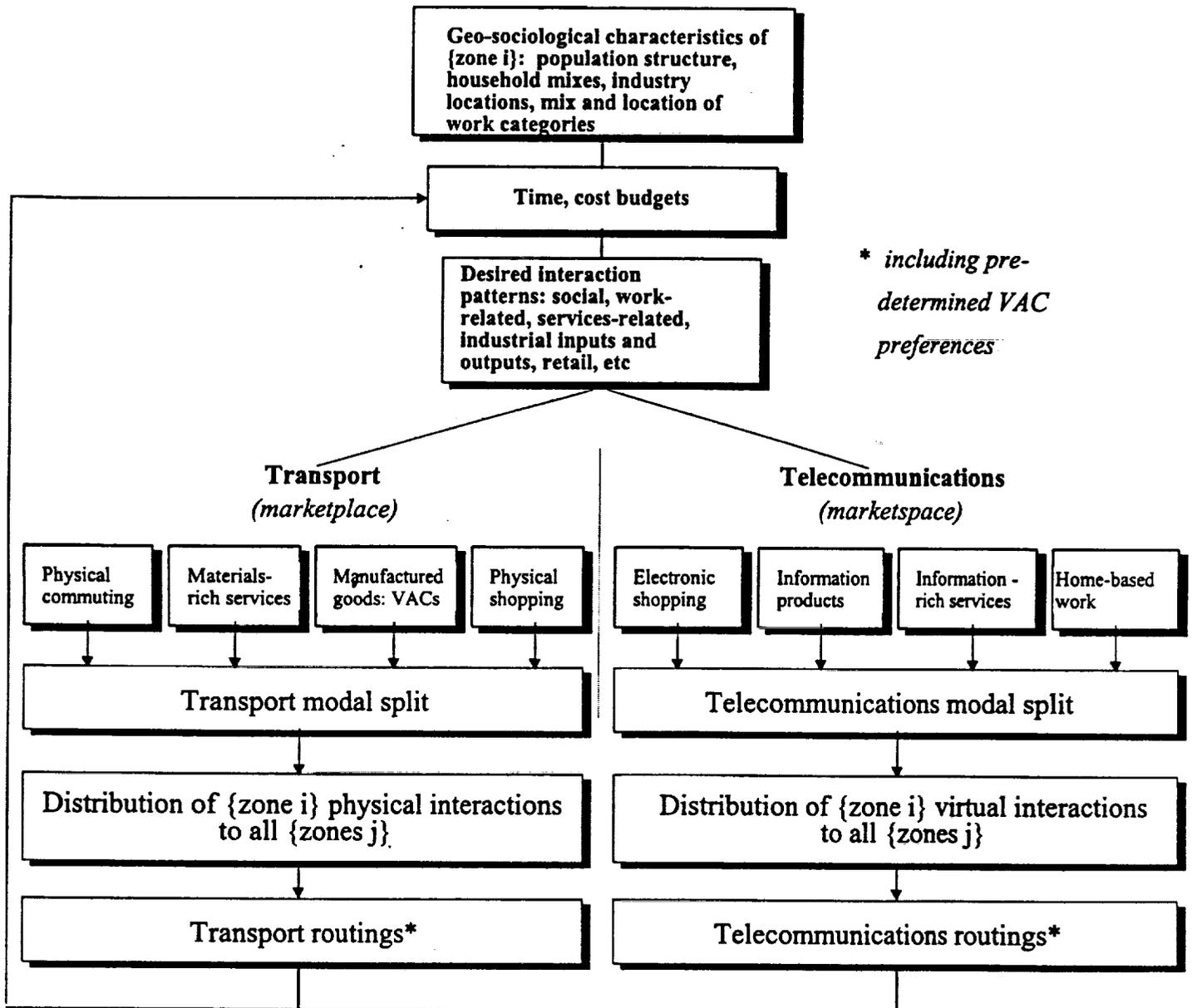
Axhausen and Gärling (1992) provide an interesting review of several conceptual frameworks and models within the activity-based approach to the analysis of travel behaviour. These frameworks would need to be extended to accommodate both forms of mobility, and also to deal with the 'time compression' implications of {physical→virtual} mobility substitution.

In the case of services or industries with a strong inter-regional or international character, the routing of transport connections would be through selected ports, airports, rail terminals, or logistical platforms including combined transport interchange nodes. Where a certain industry type had over-riding value chain preferences (such as where multinational firms pre-specify their supplier locations or where a teleprocessing facility has a specific country or firm affiliation) this could be imposed at the interaction distribution stage of the model.

The model would permit various characteristics of the transport system to be highlighted as parameters, and likewise the various drivers of modal split between transport and telecommunications. In conventional fashion, the model could be used to check various 'what if?' type permutations of the pivotal variables, and various policy scenarios embracing transport, telecommunications and/or various aspects of social organisation.

For instance, in their work Bieber et al distinguished three over-arching scenarios: 'conservative' (in which importance is given to the cultural role of cities), 'modernist' (characterised by a concentration of banking power and an emphasis on technology), and 'post-modernist' (associated with an individualistic, liberal dynamic).

Figure 7: Composite transport-telecommunications model framework



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AIR CARGO *BUSINESS RELATIONSHIPS*

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Paper:

AIR CARGO *BUSINESS RELATIONSHIPS*

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CONTENTS

<i>Abstract</i>	<i>iii</i>
Introduction	1
Part I Air Cargo Historical Overview	2
Part II Industry Structure	2
Part III Shippers & Providers Focus	6
1. The Shippers' Needs	6
2. The Providers' Endeavors	9
Part IV Insight into the Providers' Group	13
1. The Airline/Forwarder Duo: The Present Situation	13
2. Economic Analysis of the Current Spot Game	14
3. Theory of Vertical Strategies and the "Living-Together" Solution	16
Conclusion	22
<i>References</i>	<i>23</i>

Abstract

The purpose of this paper is to give a global image of the recent developments in the business relationships of Air Cargo players. This study is basically the evolution of previous work on air cargo economics, but this time more focalized on the strategies of the industry's participants. Where firms compete, how they compete and what changes will take place in the cargo environment in the near future are some of the subjects herein discussed. We will also contemplate the strategic efforts done by both the integrators and the airline-forwarder couple to move into each other's businesses. The central issue will however be the problematic relationship existing between airlines and forwarders. Discussion will be focused not only on today's situation, but also on the way vertical strategies can overcome the airline's problem of having their aircraft loaded (the forwarders' commitment), and the forwarder's problem in having a regular offer of capacity (the airlines' commitment).

Introduction

During the past five years the world air freight industry grew at an average of 9.8% p.a. in terms of tons¹. Even though at a slower pace due to the impact of the Asian crisis, MergeGlobal still expects growth rates to attain an average of 6.6% p.a. during the next five years. This basically means that, if the industry continues to experience similar growth rates, within ten years its size will have almost doubled in terms of volume. The main contributors to this expansion are worldwide exchanges, growth in industrial output and even the economic and social development of some particular industries such as electronic components, pharmaceuticals or fashion. For the future, we expect that the development of institutions promoting world trade, as it is the case of the World Commerce Organization and regional organizations such as the European Union, the NAFTA and the Mercosur Group, can generate further growth acting as huge catalysts of economic activity. So basically the industry is definitely a fast growing one. Indeed, during the recent past the number of participants in the industry has substantially increased and with it, new business practices were developed. Hence, the reason to study business relationships in air freight markets.

We will begin our discussion by introducing air cargo in an historical perspective. We will thereafter enter in the reality of the industry itself by presenting all the major actors and corresponding activities, while segmenting the markets in different businesses or market segments.

The third part of the paper will start by contemplating the shippers' needs and its interactions with the providers. A closer outlook will be given to the strategic trends occurring within the providers' scene, in order to perceive the direction of the industry in the near future and have a better understanding of the problems that it currently faces.

Finally, in part IV, we will develop the discussion regarding the current situation of the often litigating airline/forwarder couple. In addition, we will shortly incur into the theory of vertical integration and try to foreword a possible solution to the problem based on mutual commitment.

¹ Compounded average growth rate. Source: MergeGlobal, Inc.

I. Air Cargo Historical Overview

The first cargo flights, dating as far back as 1916, were used to transport mail. During the early 20s, postal services started to use air mode on a regular basis and in the United States they have even created their own airline – US Air Mail. Nonetheless, it was only after World War II that Air Cargo really took off. In the after war years the availability of military transports provided the airline industry with inexpensive airplanes that could be used for commercial purposes. Likewise, manufacturers started investing on civil aircraft programs using the experience already acquired with the military ones. As a result, the development experienced by the air cargo industry throughout the century is mainly due to the growth of commercial aviation. Indeed, its growth accompanied the evolution of passenger markets through the existence of available belly hold capacity.

However, events have led to see the transport of goods by air mode as a viable and sometimes essential activity *per se*. In fact, in 1947 London Aero & Motor Services (LAMS) operated regular cargo services between the continent and the UK, mainly transporting fruits. In this way, a freight dedicated airline managed to establish a bridge between fruit growers located in southern Europe and the British retailers. During the off-peak season it has organized a round-the-world flight in which it could transport commodities on a charter basis. LAMS was important because it showed the potential profitability of air freight operations. On the other hand, during the Berlin Russian blockade of 1948, air freight proved its vital role in supplying isolated populations. But it was only in the mid 60s that the industry started to gain a space of its own. Shippers began to see that it was not just the transport of perishables that was economically viable. They realized that the residual difference they had to pay in order to use air transport instead of using surface modes was offset by the savings in storing, insurance and “shrinkage”. As a result, in view of the interest demonstrated by airlines such as Pan Am and TWA, aircraft manufacturers started not only to convert DC8s and B707s to cargo configuration, but also to build combined passenger/cargo versions.

New developments were yet to come, such as the appearance of the huge and more cost-efficient Boeing 747 Freighter, the development of the outsized cargo lifter Antonov 124 or the unfolding of logistic systems. The fact is that for the past 25 years the industry has experienced an astounding development through the implementation of computer technologies, the development of cargo facilities and the emergence of new industry players.

II. Industry Structure

The nature and number of actors in the air cargo business have been keeping up with the rise of the industry. During the 1970s shippers requiring air cargo services focused exclusively on the cost of the shipment and used several providers (such as brokers and traditional forwarders) in a complex transport process. With the 80s, the number of intermediaries was reduced, while information has become increasingly important for logistic managers. As we entered the 90s the industry starts to offer complete logistic solutions and

seamless origin-destination services, values cost and service trade-offs, provides global coverage, and applies "the voice of the customer". These new trends have thus developed the emergence of newcomers in response to market needs: the integrators, the logistic providers, and the contractors. The relationships existing between the different industry participants can be structured as in the vertical setting presented in figure 1.

Vertical Structure of the Air Cargo Industry

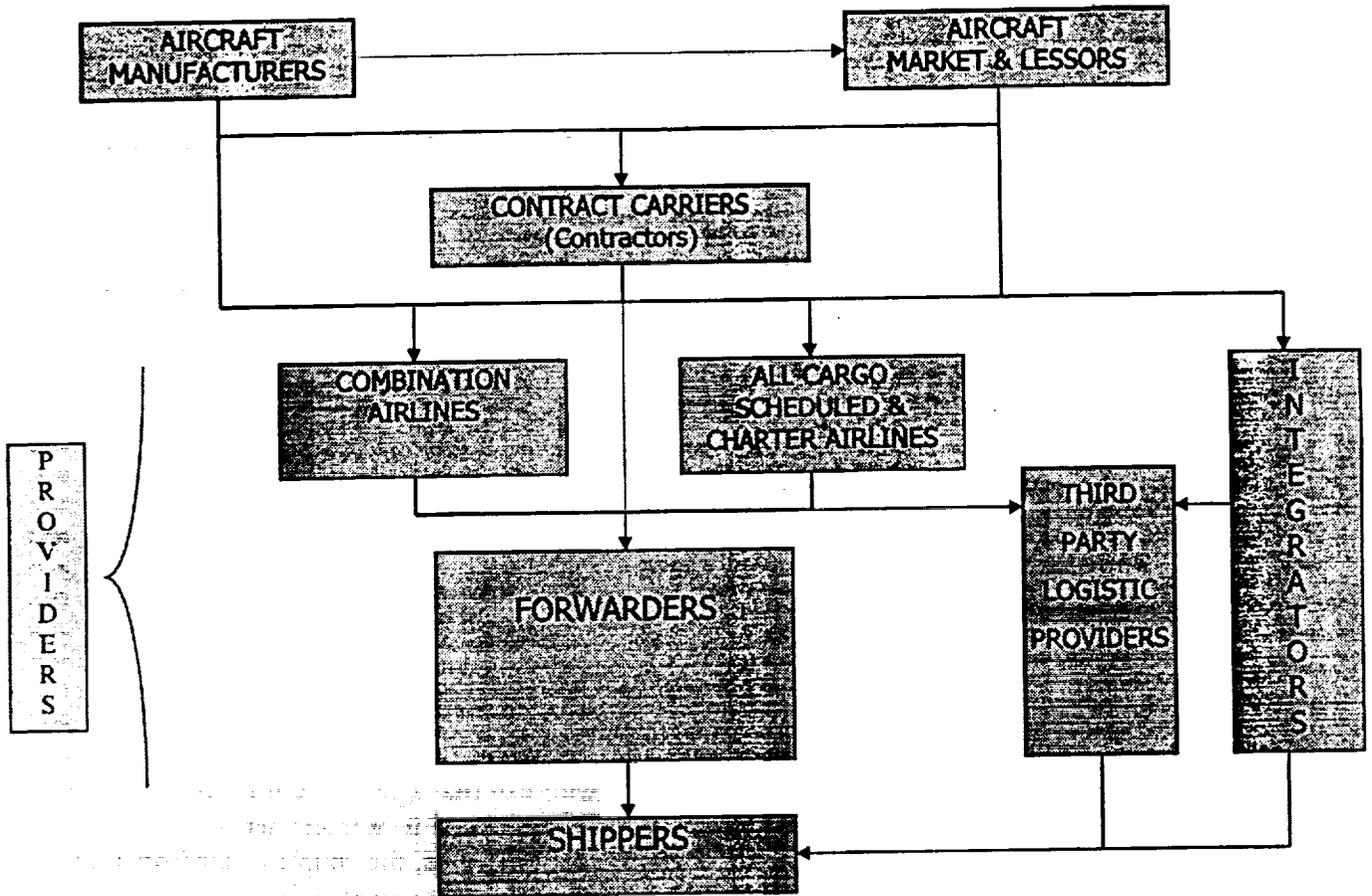
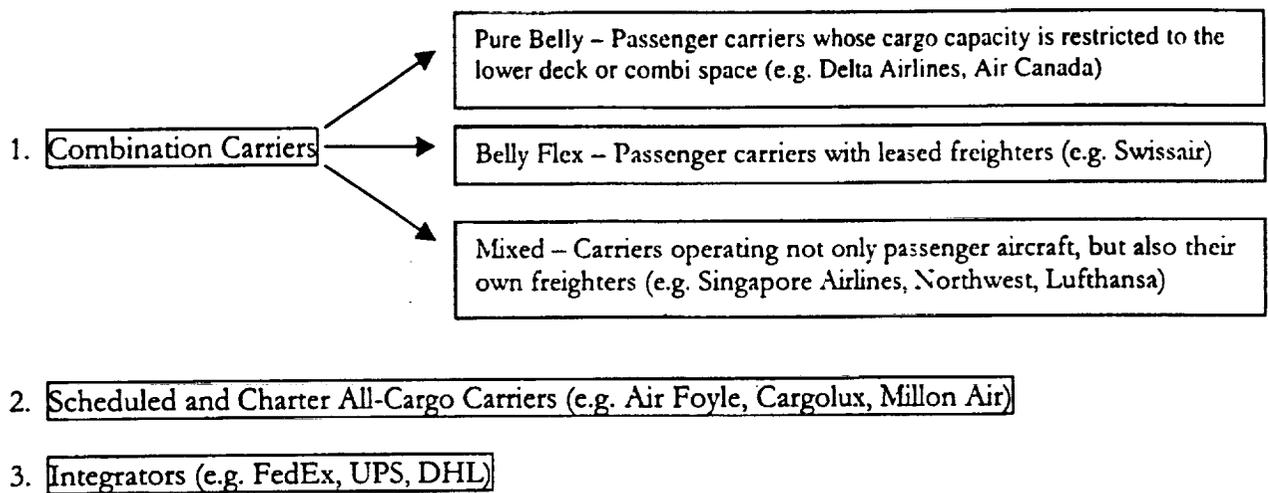


Figure 1

Airport authorities, even though playing a fundamental role within the industry, are a side party of the previous structure. They provide facilities and services to airlines, integrators, forwarders and complement transportation modes (trains, trucks or ships). The airlines in general and the forwarders complete the core of the providers' group. One can distinguish between three types of airlines:



The forwarders establish the connection between shippers and carriers, i.e. the industry retail level. This task includes the choice of inter-modal transportation from the shippers' warehouses to the consignees' addresses, which basically means that they pick-up the commodities, choose a carrier able to perform the line-haul phase, clear the goods with customs and deliver them to the consignee. Whenever we are dealing with regional or niche forwarders, the agent picking up the consignment is not the same delivering it to its destination. However, forwarders have further responsibilities such as airway bill processing, handling of consignments at the airports and insurance.

In operational terms, the competitive core of the industry - the providers - is thus formed by the airline/forwarder axis on one side and the integrators on the other. Although the former group had 96% of the international air cargo share in 1993 with the remaining 4% taken by the latter, Boeing is foreseeing that by 2015, the integrators' market share will have risen by six times. The basic strength of integrators relies on their service speed and effectiveness as a single source supplier of forwarding, consolidation, time-defined transportation and brokerage. Their major weakness is their inflexibility before customers since they only provide standardized services dealing with relatively small, low weight consignments. On the other side, combination carriers and all-cargo airlines are much more flexible regarding special transport services, but they have to deal with external agents (the forwarders) which are organized in a quite competitive market (20 multinational forwarders detain 40% of the market). If there are no long-term agreements or partnerships, the couple airline/forwarder will inevitably take longer performing the service than the integrated firm will. It is all a question of incentives since we are dealing with profit maximizing independent firms.

Apart from the core actors, we can still distinguish another industry provider: third party logistic suppliers. These newcomers represent the ultimate outsourcing option in selling complete logistic solutions to shippers willing to concentrate on their core business. They provide a wide range of distribution services including: just-in-time and next day deliveries, warehousing facilities in different locations around the world, accurate inventory control and a program that optimizes geographic stocking locations according to inventory requirements, delivery schedules and corresponding costs.

Lastly, other recent actors of the air cargo industry include the so-called contractors. Companies such as Atlas Air provide freighter lift capacity to both cargo/combination

carriers and integrators on an 'Aircraft, Crew, Maintenance and Insurance' (ACMI) basis. Companies such as Gemini Air Cargo and Evergreen International offer both ACMI wet-lease contracts and all-cargo charter operations. The contractors business consists thus on buying aircraft at the best prices, converting them (when they are not pure freighters) and afterwards operating them for carriers that were not willing to fly the planes themselves. This option is particularly interesting whenever a carrier needs additional lift but does not want to incur on aircraft investments before it knows the corresponding market return.

However, all of these actors work at different fronts inside the industry and in specific segments they may even compete with other modes, such as trucking or ocean shipping. As Michael Porter once discussed, "definition of an industry is not the same as definition of where the firm wants to compete (i.e. defining its business)". This is what market segmentation is all about. A meaningful division of Air Cargo into different market segments should be performed according to urgency requirements and the weight and nature of consignments (product performance and product characteristics). Hence air cargo activities can be segmented by product into three distinct cargo market segments:

PRODUCT SEGMENTATION FOR THE AIR CARGO INDUSTRY

Market Segment	Description	Customer Requirements	Air Eligibility
Express/ Urgency Segment	<ul style="list-style-type: none"> • A seamless door-to-door time-definite transportation of documents, parcels and low weight consignments; • Highly service driven; • Premium market; • Mainly operated by the integrators; 	<ul style="list-style-type: none"> • Speed; • Reliability – Security and time-definite guaranteed services (e.g. delivery in 48 hours before 10 am or before 12 p.m.); • IT Support – Real time information of shipments status and location; 	<ul style="list-style-type: none"> • Low Weight; • High Value; • Time Critical;
Routine Perishable Segment	<ul style="list-style-type: none"> • Transportation of physical perishables (such as flowers and fruits) and economic perishables (such as fashion clothing, newspapers and magazines); 	<ul style="list-style-type: none"> • Flexibility and customization; • Guaranteed service, otherwise the products may lose all its intrinsic value; • Good transportation conditions in order to minimize product damage or deterioration; 	<ul style="list-style-type: none"> • Time Compression;
Routine Non- Perishable /Supply Chain Segment	<ul style="list-style-type: none"> • Comprehends the traditional heavyweight industrial products (i.e. hard freight); • Just-In-Time concept is applied for «zero stock firms» ⇒ ↓ Total Distribution Costs • Covered by the airline/forwarder axis and newcomers third party logistic providers; • Forwarders typically consolidate tenders with which they arbitrage both belly and all-cargo capacity; 	<ul style="list-style-type: none"> • IT Support - Track and tracing capabilities • Values cost-service trade-off; • Flexibility and customization; 	<ul style="list-style-type: none"> • High value-to-weight products...but not only... • Just-In-Time may attract average or low value goods ⇒ savings on capital costs, inventory and insurance;

Figure 2

PRODUCT SEGMENTATION BREAKDOWN & MODAL POSITIONING

The US-Far East Market Example

Illustrative Industry Segmentation

U.S.-Far East Market

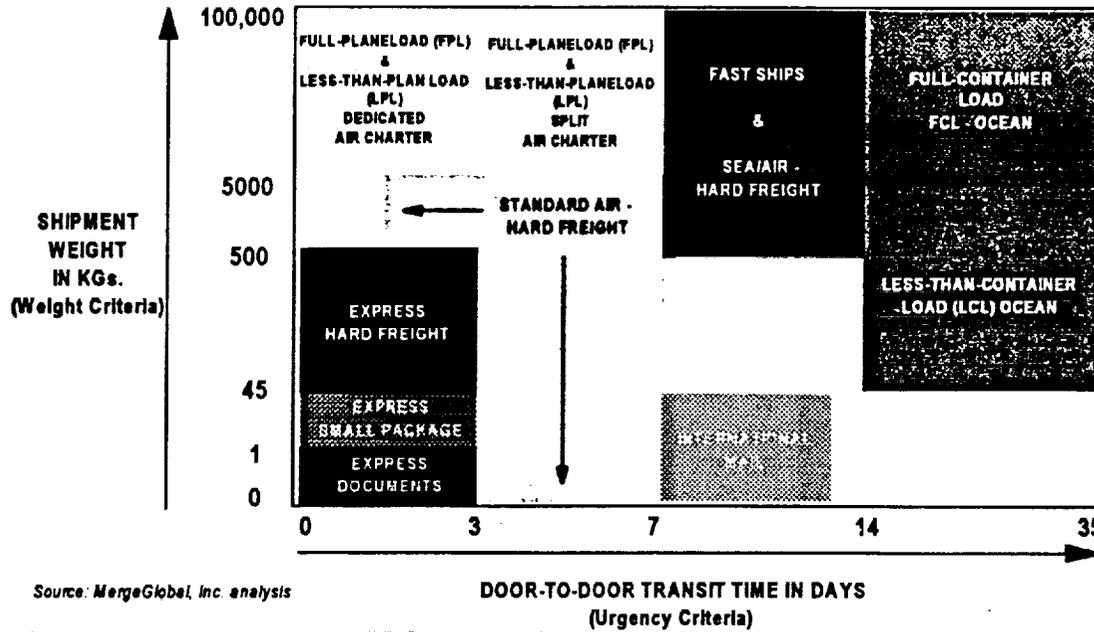


Figure 3

Even though the above market selection was performed according to a product criteria one may as well argue that there is also a certain customer segmentation on grounds of a carrier's geographical coverage.

III. Shippers & Providers Focus

1. The Shippers' Needs

The imposing question is what characterizes shippers' needs since these will ultimately determine the nature of each market segment. In other words, what makes them have such needs and how well the providers are fulfilling these needs.

Air cargo is basically the transport of freight, excess baggage and mail by air mode, wherein the notion of freight itself includes all types of commodities and parcels. The intrinsic nature of the industry makes of its products a "derived demand"- a service that is acquired to complement another activity and is valueless *per se*. Basically, shippers use the industry services in order to sustain their supply chain management and/or to have their products sold in different geographical locations.

In fact, the increasing globalization of business operations has been driving the shippers' level of demand on transportation and logistics services. The reasons lying behind this internationalization trend include:

- the need to have geographical diversification;
- the existence of market potential elsewhere;
- the possibility of expansion based either on a distinctive capability, such as reputation, or on a cost competitive advantage acquired through a particular technology or the development of economies of experience;
- the sourcing of raw materials;
- the economic benefits of low labor costs in the hosting country;

Therefore, as far as the cargo industry is concerned, the operations of such firms can be viewed in two fronts:

- the production of goods (plants established in different regions of the globe or even distinctive phases of the production process differently located);
- the marketing of the goods produced (consumer markets covering distinct continents of the planet);

As a result, firms are being constrained by the need to have well-implemented distribution channels and consequently resort to transport providers capable of satisfying the requirements of these distribution structures. This means having an expanded network of multi-modal transportation services with customer support in each of such locations. Moreover, this means as well having not only the flexibility but also the know-how to respond to different sorts of shippers' requirements.

As these requirements get more complex, firms will ultimately wish to minimize the number of transport providers they deal with. This is only natural because in this way shippers can develop a closer relationship with their provider and thence get a more customized service (the provider adapts to the shippers' conditions and not the other way around). Such partnerships between shippers and providers would eventually enable the latter to develop a fixed portfolio of client companies and in that way allow them to understand better the shipper's needs and reduce market uncertainty, simultaneously decreasing operational costs. Moreover, to the benefit of providers, if there is a long-term relationship defined on a contract, or even an external architecture based on shared knowledge, the costs of a break up might be considerable. In other words, the offer of flexible responsiveness and a customized product would inevitably bear switching costs to the shipper and namely: the research for a new service providing the same capabilities as the former one or even the potential substitution of IT supporting systems. On the side of the shipper, the advantage of the situation inevitably lies on the simplicity provided through the 'one-stop shopping' concept both in terms of transaction costs, and the structural organization of distribution pipelines. Even though facing switching costs, the former group would also benefit from some bargaining leverage with the providers due to the volume that their business may generate.

One-stop shopping will then be quite important for shippers wanting to implement 'just-in-time' systems in their supply chain structure. Working with "zero stocks" demands highly reliable services from the transport providers which means that time-definite products will be quite demanded. The core process of implementing a JIT system relies on increased inventory velocity, which has turned out to be one of today's main shipper concerns. Basically, its relevance resides in the ability to decline production cycle times to optimal levels. But not only. The application of the JIT concept in logistics management also allows savings in inventory carrying costs and specifically:

- inventory costs of stocking - investment in working capital;
- inventory risk costs - material costs of obsolescence, spoilage and pilferage;
- capital costs of warehousing;
- inventory service costs such as insurance and taxes.

Naturally, the air freight industry has a determinant role in this process since it can speed the turnover of inventories and therefore diminish total distribution costs when compared to other modes. The key is that even though air is typically more expensive than surface, the decrease induced on inventory investment more than offsets the transportation cost and consequently reduces the overall distribution cost.

This analysis is above all valid for the routine non-perishable market segment, which will increasingly demand a more reliable service in order to sustain a supply chain operation. We should then bear in mind that JIT does not necessarily mean speed, but time-certain delivery. As a result, alternative modes have serious chances of competing with air on the transport of industrial hard freight and namely, fast ships are capable of a relatively good performance in terms of speed combined with very attractive costs per kilo. Moreover, ocean shipping companies have been heavily investing not only on the modernization of container ships but also on information capabilities through the use of satellite technologies². This will help them to tackle their problem of reliability and simultaneously compete within the routine non-perishable segment.

In a more radical perspective, one of the latest trends driving shippers' needs is their willingness to outsource third party logistic providers. The need to focus on the firm's central activity and optimize production plans according to demand has been taking an increasing number of companies to opt for suppliers of transport, logistic solutions, inventory management services and distribution optimization. This outsourcing option will ultimately allow shippers to both rationalize infrastructure by needing fewer warehouses, and improving their operational profitability by increasing plant productivity.

In practical terms, this settlement is usually based on the alliance of a shipper with a third party, which may include a logistics consultant, an IT specialist in order to develop information systems and a firm responsible for the transportation role. But to succeed the

² It is nonetheless commonly known that one of the main problems with shipping products by ocean mode is the fact that they get stranded in ports due to congestion. However, sea port authorities have been introducing computerized clearance systems that enable them to reduce handling time at port sheds to just a couple of hours.

logistics provider must offer not only the flexibility and reliability desired, but also implement systems of quality control in every phase of its process.

ALL THEY WANT IS...

<u>Shippers' Needs</u>	<u>What do they require from the industry?</u>
Global Distribution Pipelines	<ul style="list-style-type: none"> • Geographical coverage and local market knowledge
One-Stop Shopping	<ul style="list-style-type: none"> • Providers with extended networks, multi-modal capabilities and a vast offer of services • Flexibility • Customization
Increased Inventory Turnover	<ul style="list-style-type: none"> • Time-Definite services • Reliability
Infrastructure Rationalization & Focus on Core Business	<ul style="list-style-type: none"> • Providers able to offer not only transportation services, but also inventory management systems, logistic solutions and storing facilities.

Figure 4

2. The Providers' Endeavors

At the providers' scene we may distinguish different strategies according to each firm's market position. Although positioning should be related to each company's source of competitive advantage, the increasing offer of distinct services provided by each type of participant in the industry has been outstanding. Specifically, the endeavors of scheduled carriers in entering the express business and the attempts of the integrators to penetrate the industrial hard freight market, which characterizes the supply chain segment. We will first tackle the forwarder scene and the integrators' plans for the near future before analyzing combination carriers' strategies.

At the forwarders' level the main trend is probably the consolidation process occurring in this business, as multinational companies are either merging or taking over smaller agents. The declining yields that the traditional hard freight markets have been experiencing combined with the need to become more competitive (both in terms of cost and services offered) justify the recent moves at the cargo retailing level. In particular, the fact that shippers have been rationalizing their source of transportation supply is probably one of the main reasons stimulating the market's consolidation process. The exception is niche forwarders who have either gained expertise in the transport of specific commodities or dominate a certain geographical area. This specific group will probably continue to enjoy above average market returns. All of the middle-sized forwarders that are not proficient in any particular market or were left out of the tie-ins will be what Michael Porter called

“stuck in the middle”³. In other words, they will not be able to compete with multinational forwarders since they do not have either the scale or the scope to do that, nor will they be able to rival the niche agents. Such scenario will probably induce many of these forwarders to leave the market.

Similarly to what has happened between Swiss forwarder Danzas and UPS, DHL has recently announced a strategic partnership with Kuehne & Nagel⁴. For the forwarders, this is their chance to take a share of the express market segment by using the integrators' networks to have their low weight packages delivered. For the integrators, this is a guaranteed way of having high load factors and enhancing market returns. It does not necessarily mean that they are giving a part of their business to competition. Basically, its incentive is filling the opportunity of selling what they are good at to a third party that has not the capabilities in terms of lift, scale or know-how to perform it by itself. This only makes more sense when we consider the current shippers' trend of consolidating the number of suppliers they deal with.

In addition, the integrators' partnership with the forwarders may as well represent an entrance door into the hard freight market by using the agents' expertise and multi-modal capabilities on industrial shipping. Yet, the integrators' endeavors into the supply-chain segment are not constrained to tie-ups with forwarders. In fact, they have been inducing the shippers they work with to submit their hard freight in smaller but more frequent tenders instead of the usual large shipments. In this way, the integrators are trying to enter the profitable market of the supply chain without making substantial investments in equipment that would otherwise be necessary to handle the consignments. The problem with this approach is that by using their current capacity to explore another market segment, they are not solving their inflexibility issue. Indeed, the integrators operations are based on a hub and spoke system with short connections and where flight punctuality is essential in order for the whole system to work. Such structure does not allow delays of a tender. Moreover, due to handling efficiency optimization the product they sell is highly standardized, which significantly reduces their ability to customize their services⁵. Lastly, their network is prepared for a door-to-door delivery of up to 3 days – the problem is that not all time-certain services are time critical. Nonetheless, this does not mean that the integrators' efforts should be taken lightly. They do represent a threat to the traditional airline/forwarder duet, since they are offering something that the latter group has been so far, unable to rival.

The interesting discussion will therefore concern the next moves coming from the integrators. Clearly, they have been performing extremely well in their core business and they have been able to develop a reputation for a seamless and reliable door-to-door service⁶. But would they be able to redeploy this distinctive capability into a completely

³ “Stuck in the middle” is being interpreted here as the relationship between a firm's overall strategy and that of its competitors. Porter's approach was not about mid-market positioning, but of confused strategy or the lack of it.

⁴ Both Danzas and Kuehne & Nagel are major players in the forwarding community.

⁵ In other words they cannot receive lumpy tenders without cannibalizing their express market capacity.

⁶ The figures are quite explicit. When integrators first started in the United States, they carried no more than 5% of national air freight. However, nowadays they control over 60% of the US market.

different market segment, where brand loyalty is virtually overlooked? Simultaneously, they essentially have no competitive advantage over incumbent carriers since:

- they would be forced to acquire new aircraft – the existent capacity is already allocated to the highly precise express operation where turnaround times are short, and accumulated delays would corrupt the whole structure of the business;
- investments in personnel, premises, handling equipment and trucking would be required;
- they are vertically integrated companies that rely purely on their own services or those of subcontracted parts; however, the spot nature of the hard freight market makes this business substantially different from what they know at the express segment.

The only economies derived from the integrators' current operations would probably be the existence of bargaining leverage in aircraft acquisition and the benefit of getting lower airport fees. The conclusion is therefore that such a scenario does not seem to be a particularly viable option, especially if we take into account the yield difference obtained in both markets⁷. In other words, why should the integrators diversify into the riskier heavy freight business if their return is much smaller. Even if they could charge a higher rate in this market segment due to the offer of a reliable service, how much more would shippers be willing to pay for their vertically differentiated product? Would that be sufficient to attract the integrators? The question is raised.

The success of combination carriers in playing a role at the urgency segment is still quite unclear. Airlines such Singapore or Air Canada have been developing airport-to-airport or in some cases airport-to-door express products, with money back guarantees in case of failure to deliver the consignments within a pre-determined time span. In Air Canada's case, there is last minute acceptance and quick retrieval times at the airports but the system is only available within Canada and valid for packages up to 32kg⁸. For a door-to-door service an additional fee is charged. On the other hand, Singapore Airlines' Swiftrider and Timerider products cover the airlines' entire network and comprise as well large shipments. Like in Air Canada, the service is available on an airport-to-airport basis. The central point is that the airlines are not able to work as integrators, since they do not have the trucking capabilities required to offer a door-to-door service and they cannot rely on the forwarders to operate in such a limited time scope. We may distinguish two different situations according to the type of combination carrier involved:

1. Belly airlines such as Air Canada are basically using their highly frequent incrementally-costed belly lift in order to sustain an express product line. This is the reason why most airlines only offer these services within Europe or North America where they can operate several daily flights. The rationale is that they can only compete with integrators in regional markets because they do not have the structure to support a round-the-world express operation – that is not their core business. In other words,

⁷ Even taking into consideration that integrators have also been experiencing declining yields in their documents business.

⁸ Source: Air Canada

most of combination carriers' focus is the passenger market and they are only using their available belly capacity to market express products.

2. The time-definite services introduced by carriers with organic freighter capacity (e.g. Lufthansa, Singapore or KLM) are indisputably more flexible in terms of density allowance than those of DHL, FedEx or UPS. Even though these services closely resemble those of the typical integrator, the latter is still able to perform it on a door-to-door basis in any part of the world.

What would then be interesting to know is if this incursion into the express/urgency segment is being profitable. The rationale is that belly airlines are unable to discern their true costs of carrying freight, which means that they cannot know if they are making money or not. Indeed, their passenger operation may well be subsidizing the costs of cargo lift. In a certain way, the same reason applies to mixed carriers since their time-definite product is performed by using not only freighters' capacity, but also belly lift. Indeed, most mixed carriers do not have enough freighters' frequency in order to sustain a global express product – they must resort to their daily belly capacity.

EXPANSION OF SERVICES TO OTHER MARKET SEGMENTS BY TYPE OF AIRLINE

U.S.-Far East Market

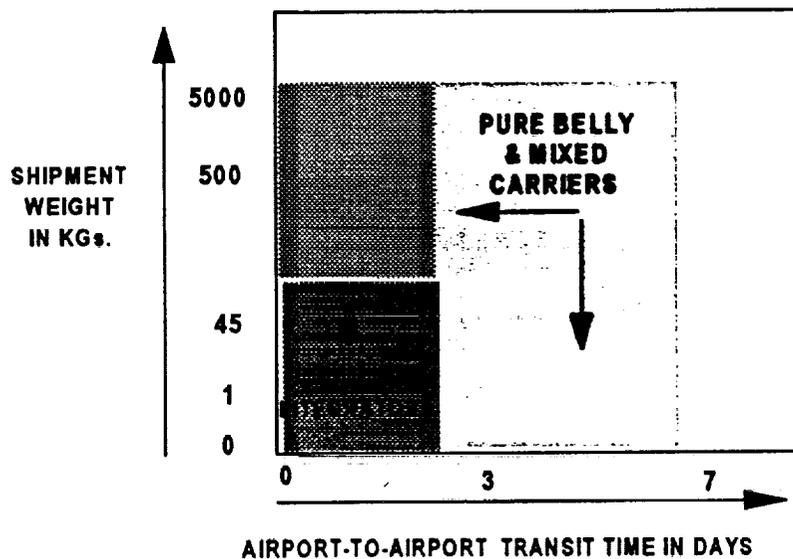


Figure 6

Within this scenario competition in each of these market segments will be fiercer. Still, the nature of the express/urgency segment will not allow differentiation as a way to reduce market rivalry. In effect, express delivery customers are a sort of premium market with very objective needs. As a result, the players of this market have to keep up with all product innovations that occur in the market if they want to remain competitive (copycat strategies). We should stress that this is above all, a service (not a price) driven segment.

The routine non-perishable segment will probably be more affected by the increased rivalry. This will not contribute much to the augmentation of hard-freight yields, which have been experiencing a sustained fall of approximately 3% p.a. for the past twenty years⁹. Differentiation as a way to smooth competition will be basically vertical. We believe that the players in the segment (integrators, airlines/forwarders and third party logistic providers) will offer distinct services at different quality levels and prices. For example, third party providers will be selling complete logistic solutions while integrators will offer reliable hard freight transportation. At the same time, the airline/forwarder couple may sell know-how and flexibility in their transportation product or, may act as in a spot market through consolidation processes and rates' arbitrage. In this last case the "couple" would be providing a non-reliable service but at a lower cost to the shipper. This is what is currently happening in most situations. But is this what major shippers are looking for? If airlines and forwarders do not put in practice a common strategy to hold the supply chain segment and satisfy their customers' needs, the integrators will be successful in taking over this market. The "couple" has the resources and know-how to provide both reliable, time-certain, door-to-door quality services, and regular air freight operations with time estimated deliveries (as opposed to time-definite ones). What has been preventing them to take profit of their joint capabilities is what we will be now analyzing.

IV. Insight into the Providers' Group

1. *The Airline/Forwarder Duo: The Present Situation*

The traditionally endemic relationship characterizing the "couple" airline/forwarder can be resumed as follows.

at the forwarders' level,

Air forwarders have a short-run profit maximizing goal. Hence they exert from airlines as much surplus per transaction as possible. The ultimate objective is to optimize their own surplus since the shippers will always pay the same price for the consignment. Specifically, their way of doing business goes as hereinafter:

- they optimize their consolidation process;
- they arbitrage between different airline bids for a specific tender.
- they book at least one flight in order to guarantee the lift, and thereafter,

⁹ Source: Lufthansa Cargo

- if they are able to find a lower rate than the one booked, they will relentlessly change to the cheaper carrier;

Then if anything goes wrong, such as any delays or losses, they will frequently deny their responsibility and blame the airlines for indifference towards freight. This is particularly true for small/mid-sized non-integrated forwarders, although freight consolidation and rates' arbitrage are intrinsic elements of the forwarding business.

at the airlines level,

Most combination carriers usually focus on the passenger market, leaving cargo as a secondary activity. In fact, the offer of lifting capacity is most of the time passenger driven in terms of routes, schedules and equipment type. One of the other forwarders' complaints concern the fact that in some cases, airlines having a particular interest in the cargo business tried to pass over the forwarders. They claim that such carriers try to overrun them by contacting directly with the shippers, i.e. work both at the wholesale and retail levels. The carrier's common argument is that they need a certain security and in specific routes they must have a base load. Moreover, airlines are regularly accused of overbooking and then being unable to transport the goods. But they claim their need to diminish the probability of having their lifting capacity unused due to forwarders' typical behavior. This is quite simply the "ping pong game" that has been going on for too long.

2. Economic Analysis of the Current Spot Game

Whenever forwarders book a flight with an airline *abc*, and afterwards they search for a better rate by arbitraging between airlines, we may well be facing a typical principal-agent situation: the so-called moral-hazard problem. The basic argument of moral hazard, otherwise called the problem of hidden action, is that once a contract has been established, the principal cannot observe and/or verify the actions done by the agent. This means that there is symmetric information *ex-ante* but not *ex-post*. In our current game the agent is the forwarder and the principal is the airline.

The situation goes as follows: the forwarder has consolidated several consignments and "built" a tender to be shipped in day X. He researches all the potential capacity available in the market for that day. He will then book the tender on airline *abc* in order to make sure it departs on day X and in the meantime, he will use its leverage (if any) in order to get the rates down from other airlines. If he succeeds he will no longer have its tender transported on airline *abc*. Economically speaking, once the contract was formally established (booking), airline *abc* could not observe nor verify the forwarders future actions before the completion of the contract. As there is typically no penalty for no-shows, the agent does not bear any uncertainty for contingent outcomes of the transaction. Only the principal is affected by the result of the deal, which means that it is the airline bearing all the risk inherent to the transaction. The relevant question would then be why is there asymmetric information in this situation. In other words, what has changed after the booking that gave an informational advantage to the agent? The rationale is that the forwarders make money by taking advantage of having all the pricing information on the market and "bluff" in order to get the

lowest rate. As airlines do not know each other's bids for the available capacity, they cannot predict the existence of opportunistic behavior from the forwarder. Moreover, the more credible the forwarders' bluff, the bigger the surplus the agent will get from the principal, especially whenever the tender concerns perishables. In practice, airlines have been protecting themselves by overbooking. However, carriers such as Emirates or KLM have been supporting the introduction of penalties for both no-shows and not-flown-as-booked. These would work like incentive schemes against opportunistic behavior in the *ex-post* stage of the transaction¹⁰.

The recent development of Cargo 2000¹¹ will bring the industry Electronic Data Interchange compatibility. If this happens, the forwarders will lose their informational advantage because all airlines with available capacity will know the offers of the market and will not be willing to reduce their bids as before. Unless multinational forwarders truly want to form partnerships with major carriers in order to provide better services, there is no motive whatsoever for the forwarding community to be keen on establishing an industry-wide EDI platform. Clearly, the main loser will be the mid-size forwarder that will no longer be able to make profits of arbitraging. Its survival will depend on its consolidation process. If we then take into account the tenders of multinational forwarders and the mergers taking place in this community, we can easily conclude that Cargo 2000 will only accelerate the shrinkage that will take place at the forwarders' scene. Multinational groups and niche forwarders will then dominate the market.

In practical terms, the fundamental problem with the airline/forwarder relationship is probably the fact that both carriers and forwarders have been ignoring until now their ultimate customer, the shipper. Carriers treat forwarders as price driven clients and not as partners while the latter are more preoccupied with eventual talks involving shippers and carriers at the same table than with shippers' needs. The point is that airlines and forwarders, instead of competing against each other, should agree on the best way to satisfy their customers' needs, that is: *i*) what do they want? *ii*) how can we provide that? This is the only way the traditional airline/forwarder axis will be able to survive, otherwise the shippers will opt for the less flexible, though more reliable product offered by the integrators. As Guenter Rohrman from Air Express International (multinational forwarder) stated, «we [forwarders] don't generate a single kilo of revenue producing freight. Our customers do. And the comments in the aforementioned white paper [the European Air Shippers Council white paper concerning the future of Air Cargo, dating from September 1995] indicate that shippers believe they are being left out in the cold».

¹⁰ Asymmetries of information may raise a further problem involving forwarders. It can be argued that there might be some moral hazard actions from the forwarder at the downstream side. The rationale is that the shipper does not know if the agent is giving him the best service he can for the price the former has paid, or if the latter values more its own interests (at the expense of the shipper). As an example we know that shipments are usually held for consolidation at airport sheds before being tendered to airlines. We also know that the choice of airline is done by the air forwarder. It might happen that the cargo agents' choice is very convenient to him in terms of cost and/or airline/forwarder relationship but not as favorable as it could be to the client, i.e. it might exist a better/faster solution to the shipper's request that is not taken in view of the forwarders' interests. This does not necessarily mean that the choice done by the forwarder results in a bad outcome. In fact, it can even respect all the shipper's requests, but may be there was a better option. The present situation is all about the best *rapport* price/quality.

¹¹ Cargo 2000 is an alliance of major forwarders and airlines grouped to standardize business practices.

The bottom line is that, unlike integrators, multinational forwarders can provide a whole range of supply chain management products tailored to the specific needs of the customers and airlines have the lift capabilities in terms of payload, frequency and network. Apparently, combining both skills seems to be the problem faced by this axis. So the relevant question is : what has prevented them from reaching a consensual arrangement in the past ?

Airlines have been focusing on their passenger activity, which is the one that gives them higher returns (for many airlines cargo represents no more than 7% of their revenues). Then, it often happens that freight is scheduled to be transported in a particular flight but because of the passenger payload, it has to remain on land (due to space and weight constraints). This situation, which has been common practice until now, encloses the essential problem: airlines cannot invest in capacity nor can they upgrade their services if they do not know if this upgrading will be profitable. In other words, they need forwarders to give long-term volume commitment.

We will now cover some issues regarding the theory of vertical strategies in order to understand the economic problem lying underneath this situation.

3. Theory of Vertical Strategies and the «Living-Together» Solution

Nowadays transactions can be organized in innumerable ways. Basically transacting at the market implies one of the following forms of contract:

- Short-term contracts (spot contracts)
- Long-term contracts :
 1. Classic Contracts
 2. Implicit Contracts (similar to external architecture)

Or transactions can also take place internally, that is, without passing through the markets. This last situation corresponds to a transaction that occurs inside the same firm or within an integrated firm.

The type of contract or transaction option that will take place depends on the costs associated with each transaction's nature. When contracting via the market two main types of costs arise:

1. those occurring before the signature of the contract (pre-contract stage) and,
2. those occurring during the implementation of the contract (i.e. once it was signed).

1. *Ex-Ante* Transaction Costs - Costs of negotiating, drafting, designing and safeguarding a contractual arrangement. Safeguarding is particularly important because it addresses simultaneously, at least to a certain extent, *ex-ante* and *ex-post* costs of contracting. Safeguarding costs exist because there are cognitive limitations of mind, otherwise designated as bounded rationality, which do not allow the agents to write complete contracts, i.e. contracts contingent on every possible state of nature. Moreover even if it was

humanly possible to foresee all possible contingencies it would be too costly and time-consuming to enumerate them all. An example of safeguarding in transaction cost economics might be the creation of an incentive scheme or a governance structure to protect a contractual part from bounded rationality problems or opportunistic behavior, especially when specific investments are involved. The incentive scheme might be a simple penalty for contract premature ending. A governance structure is a sort of pre-established code of rules (agreed by the contracting parts) that determines how disputes should be solved at the *ex-post* stage. Thence, in face of unexpected events, the agents will not get involved in self-interest bargaining (which might be a "painful" experience) because a governance structure has been defined *ex-ante*.

2. *Ex-Post* Transaction Costs - Costs incurred in order to control the correct application of the contract by one of the parties¹² and the costs of enforcing the contract. However, when *de facto* the implementation of the contract drives away from a certain alignment, there will be subsequent costs of correcting these misalignments. An example of monitoring and enforcement costs are the agency costs - the principal controls the effective application of the contract and thence incurs in some costs (e.g. shareholders of a firm), and the agents are given an incentive scheme (e.g. managers of a firm).

But the most relevant question is probably to know when should transactions take place in the markets or when should they be organized within the firm. The answer, given by Ronald Coase in 1937 stresses that the transaction option taking place depends on the costs associated with each transaction's particularities. According to Coase (1937), whenever the costs of market procurement are higher than the administrative costs of organizing within the firm, the transaction should take place internally.

The transaction particularities mentioned above (that will determine the associated costs) include a group of economic factors that are particular to each situation: asset specificity, uncertainty and frequency. The first of these factors is the most important one in determining the type of transaction that will take place.

- Asset specificity is a special purpose investment (opposed to general purpose investment) and thence has a non-redeployable characteristic. It is human nature that makes of asset specificity a problematic factor. First of all, because there is bounded rationality and thence not all the potential hazards are taken into account - this might lead to opportunism due to the existence of information asymmetries. In addition, the fact that within a bilateral relationship one party has to make a specific investment that has no value outside, implies that the other part obtains a bargaining advantage over the locked-in firm.

- Uncertainty refers to: potential disturbances that may occur in the surrounding environment at an *ex-post* stage, existence of broken channels of communication and behavioral aspects. As a result, uncertainty arises due to the existence of both bounded rationality and opportunistic conduct (due to information asymmetries). Examples of uncertainty include: i) suffer variations of inflation, interest rates or demand levels; ii)

¹² Or in the case of a double moral hazard problem, costs of mutual monitoring.

unwillingly miss the strategies carried by other firms in the market; and iii) be subject to hidden actions from the agents at the *ex-post* level of the contract (the previously discussed moral hazard problem).

- Frequency regards the fact that asset-specific transactions need specialized governance structures. However, particular governance structures imply a considerable cost and hence a trade-off should be done between the benefits of having such a structure and the cost of implementing this same structure. The point is that “the cost of specialized governance structures will be easier to recover for large transactions (...). Hence the frequency of transactions is a relevant dimension”¹³. In fact, Williamson argues that whenever there are transactions that need a specialized governance structure but that have a low frequency, we can aggregate those transactions that have similar nature into one governance structure in order to reap transaction economies. This means that firms cannot only benefit from the special safeguard scheme (and thus economize on transaction costs), but also implement the specific investment (and hence have its production costs decreased).

Resuming these are basically the sources of transaction costs. Whenever these three sources are very important in a certain trade situation, we will have transaction costs that are extremely high and thence an internal organization of transactions will be preferred to a market one. This is particularly true when there is asset specificity. According to Williamson (1975), the factor that justifies firms' preference for an internal organization operation over market procurement is the existence of an asset specificity. As a result, the main driver of vertical integration is transaction cost economies, i.e. it is the exploitation of these type of economies that induces firms to have a common ownership and not necessarily the fact that there are technical economies at the production process level. That would not justify common ownership *per se*. It is the sunk cost investment (probably technical) associated with asset specificity that induces the firms to choose a vertical integration option so that they can avoid the transaction costs mentioned above.

However, as Grant¹⁴ stresses, this does not necessarily mean that long-term contracts are unable to insure the parts against opportunistic behavior for example. It can be done through the imposition of governance structures. In fact, it all depends on the trade-off between the intensity of these costs and the administrative costs of internalization, which should also be considered. The costs associated with organizing the transactions internally include : the differences in the optimal scales of operations and distinct needs of flexibility (operational coordination and rapid technological adjustment favors vertical integration while efficiency in meeting unexpected demands favors market operations). Consequently, as Crémer¹⁵ asserted, the problem of a firm is not really whether to integrate or not a certain group of activities, but what is the optimal extent of this integration.

¹³ in Oliver E. Williamson, *The Economic Institutions of Capitalism*, Chapter 2, The Free Press, New York, 1985

¹⁴ in Robert Grant's *Contemporary Strategy Analysis*, Chapter 12. Oxford: Basil Blackwell, 1985

¹⁵ in Jacques Crémer *Intégration verticale: Vers un Guide pour le Practicien*, CNRS, GREMAQ et Institut d'Economie Industrielle - Université des Sciences Sociales de Toulouse

The dilemma is therefore the comparison between the intensity of transaction costs and namely the type of asset specificity involved, and the costs of internalization. We will now introduce Air Cargo into this setting.

We can distinguish between four types of asset specificity:

- site specificity,
- physical asset specificity,
- human asset specificity, and
- dedicated asset specificity.

In Air Cargo, the type of asset specificity involved when airlines are required to upgrade their services and invest in capacity to respond to the forwarders' needs (without compromising the passenger market) is dedicated asset specificity¹⁶. However, vertical integration is not necessarily a good solution to prevent the hazards associated with this sort of investment. What regularly happens is that a contractual relation can be extended in order to allow the existence of what Williamson calls symmetrical exposure. That is, if both parties are subject to similar levels of hazard due to the existence of dedicated assets, then the transaction problem is fairly resolved in the sense that it prevents opportunistic behavior from each of the parties. However, in our air cargo problem only the airlines are due to make an investment in a capacity that might be potentially underutilized. In fact, after the investment done, the forwarders would have an increased bargaining power over the prices charged by airlines, threatening that they would search a lower cost carrier in case its demands were not satisfied (opportunistic behavior)¹⁷. As a result, a long-term contract might be a good solution provided the forwarders remain committed to tender a specified number of positions. In other words, the airlines will only invest on the capacity that they know they will sell to the forwarders. In this way, depending on the contracts established and thence on the space bought by the agents, the airline will make its investment. In the same way, the carrier will only upgrade the quality of its service if it knows that it will have a demand. Once there is a fixed allotment from each forwarder contracting with the airline, we will know that demand exists.

Yet, such a solution raises a further problem: how can a forwarder commit himself to tender huge levels of goods in the long-run? The answer might be :

- multinational forwarders should choose a major airline with which they want to be associated and with which they often carry a great deal of business ;
- the agents should not commit themselves to honor extremely high volumes ; and finally,

¹⁶ According to Williamson (1975) this type of specificity refers to those investments "in generalized production capacity that would not be made but for the prospect of selling a significant amount of product to a specific customer".

¹⁷ It is clear that in such a situation, the airline could always try to sell its capacity - dedicated assets, especially lifting capacity (aircraft) are not sunk costs. In reality, the main loss would come from the investments made in quality upgrading.

- as Gunter Rohrman (Air Express International) stated, even though «some forwarders will jump from airline to airline in search of the lowest rate, many would gladly lay down their price-cutting weapons in return for high quality service from the airlines». This means, that if airlines invested on quality, major forwarders could commit themselves with an airline or a strategic alliance of carriers. The fact is that multinational forwarders can no longer act as consolidators in search for the better rate, if they want to survive the integrators' threat. Moreover, with the development of one-stop shopping and the consolidation taking place at the retail level, competition within the forwarding community will be much fiercer. As a result, we should expect major forwarders to start offering a full range of supply chain services, and for that they need a quality service.

These are two complementary businesses that need partnerships based on mutual understanding and on the definition of a certain number of commitments in order to secure this partnership. The multinational forwarder Schenker International AG has already proposed some lines through which this relationship can be designed:

- honoring of space commitments by the forwarder (otherwise it provides compensation) ;
- as little bulk as possible - forwarders tender whole containers or pallets ;

in «exchange» of,

- guaranteed lift - the airline commits to board every pallet or container for which space is reserved or provides compensation ;
- improved on-time delivery ;
- honored reservation rebates by the airline based on performance by the forwarder ;
- preferential access to capacity during peak demand periods;

The advantage of this sort of partnership over common ownership is that such a contract does not imply exclusivity as with a full integration option. In reality, airlines will give within this setting a preferential treatment to the associated forwarders (and hence, load all the reserved space by them), but can always occupy empty space with demand coming from other forwarders. Simultaneously, the agent is only responsible for the space it has bought - he can also go to another airline in case its associated does not cover a specific route (for example).

The administrative costs of integration are somehow connected with the arguments we have just seen. Despite the need for flexibility in coordination (element favored by vertical integration), the airlines want above all, the flexibility to respond to a high demand in case its forwarders do not fill all the available capacity (which is something that would not happen if the firm was vertically integrated).

To conclude, we can say that this type of «diving-together» partnership is value-adding since:

- it offers the flexibility of a market transaction but avoids the costs associated with spot contracts;
- improves customer service through better quality and a guaranteed delivery (more reliability);
- it optimizes the allocation of resources;
- stimulates the sharing of knowledge between firms, which will be important in order to have a clear understanding of the customers' needs.

Conclusion

Far are the times when the US Air Mail operated night services between Chicago and New York in their biplane Curtis R.. Almost eighty years after and a history filled with ups and downs, Air Cargo proved its economic feasibility and its valuable service, which granted the industry an indisputable role in today's world economy. The growth figures corresponding to the past two decades and the forecasts regarding the forthcoming years are quite revealing. But this is no mature industry. Air Cargo is still growing, learning about its own idiosyncrasies.

Several problems still remain on today's agenda and namely, the hottest debates have been turning around the complex relationship airline/forwarder and the consequences this tie-up is generating. As carriers search for a suitable agent, they will try to remain stronger by consolidating their networks and reducing costs where possible. In order to implement this strategy, airlines will engender global alliances¹⁸. At the forwarders' side, the reverse is simultaneously happening. The agents, in the spectrum of tying-in their services with those of airlines', will proceed to horizontal mergers as it is already occurring in the United States. Such trends will therefore promote concentration at both the airline and the forwarding level. The question is then, how can we insure that we are not strolling towards the monopoly danger? We believe this is just a developing phase of the industry to a rather competitive situation stimulated by the imminent diversification of the integrators' business into the supply chain segment. Concentration is just a survival strategy implemented by the airline/forwarder axis in order to gain a market share in the prosperous logistic business and to anticipate the integrators' move. As far as we are concerned, we think there will be a place to both integrators and airline/forwarders. But until now, the integrators are taking the lead since they only depend on their own.

¹⁸ Route re-structuring and cost reduction can be attained by integrating cargo networks and sharing both facilities and handling equipment. Such cargo alliances will also enable carriers to develop new products and make common use of computer networks.

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